ROI

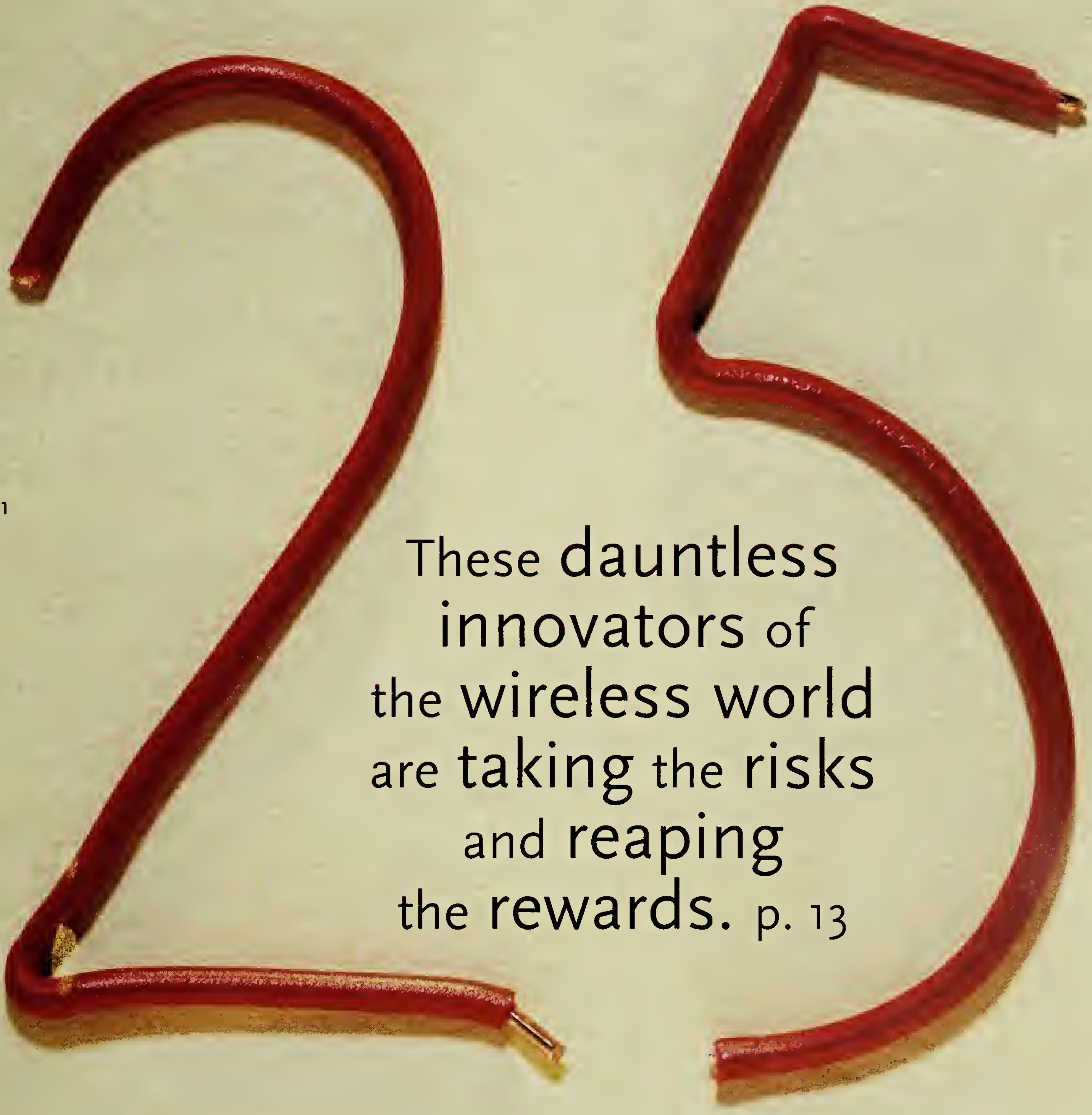
COMPUTERWORLD

TECHNOLOGY AND THE BOTTOM LINE

SEPTEMBER/OCTOBER 2001
VOL. 1 NO. 4

SPECIAL ISSUE

the wireless



These dauntless innovators of the wireless world are taking the risks and reaping the rewards. p. 13

PLUS

- Wireless Is Invading Your Privacy, p. 10
- Transforming the Customer Experience, p. 11
- The Guts and Glory of Wireless Pioneers, p. 32
- Exposing Security Flaws And Taking the Heat, p. 33

LEADING THE WAY AVECRA OY BOSTON COLLEGE CELANESE CHEMICALS CITY OF FAIRFAX, VA. CITY OF PAINESVILLE, OHIO CITY OF RICHMOND, BRITISH COLUMBIA ETRADE GROUP INC. FIDELITY INVESTMENTS FORD MOTOR CO. HARRIS BANK ITC MESA ENERGY SYSTEMS INC. MIAMI-DADE BUILDING DEPARTMENT NASA'S GODDARD SPACE FLIGHT CENTER OAKWOOD HEALTHCARE INC. PACKAGED ICE INC. PFIZER INC. PRI AUTOMATION INC. PRODUCERS LLOYDS INSURANCE CO. SIX CONTINENTS HOTELS THRIFTY CAR RENTAL UNITED AIR LINES INC. UNITED PARCEL SERVICE INC. U.S. ARMY, EUROPE WESCO DISTRIBUTION INC.

A SUPPLEMENT TO COMPUTERWORLD

1. This is the CUSTOMER
2. That accessed the Account
3. That linked with the Database
4. That verified the Deposit
5. That released the Funds
6. That paid the Loan
7. That updated the Records
8. That triggered the Statement
9. That completed the Process
10. That lives in the Integration Software
11. That we Built.

Financial institutions savvy about their integration investment know that we don't just connect applications—we automate business processes. For the full story, visit www.crossworlds.com

CROSSWORLDS® SOFTWARE

Integration is more than just connections™

© 2001 CrossWorlds Software, Inc. CrossWorlds and the CrossWorlds Software Logo are registered trademarks, and "Integration is more than just connections" is a trademark of CrossWorlds Software, Inc.

CONTENTS

COMPUTERWORLD ROI VOL. 1 NO.

risk & reward

13 The Wireless 25

14 Leading the Way

Along with the security, cost and support challenges that come with being an early adopter of emerging technology, the one thing wireless innovators can count on is that the competition will be breathing down their necks.
BY ALAN RADDING

24 Taking the Leap

Big companies have big security complexes when it comes to wireless. Here's how several innovators overcame them.
BY MATT HAMBLEN

28 Kicking Back

Workers report less stress. Yet there are other real business benefits to having a wireless workforce: increased production, reduced service costs and faster cash flow, to name just a few. BY MARY BRANDEL

featured online this month

Online Archives

Computerworld ROI's new online archive of case studies features a wealth of business and financial details about technology implementations at a growing list of companies. Search by key technology or across multiple industries to see how other companies have delivered ROI. *Go to* **www.computerworld.com/roi** *for details.*

4 Taking Stock, Contributors

top line

6 **Check the Fine Print:** Companies are largely unaware of outsourcing's hidden costs; **Info Wastelands**: Why users aren't lining up to tap corporate intranets.

peer review

10 Golden Rules

BY THORNTON A. MAY
Ignorance may be bliss, but wireless users need to know how vulnerable they are.

11 Tip Sheet

BY NINA LYTTON
Wireless access boosts productivity and customer satisfaction and breathes life into products. What's not to like?

bottom line

31 Money

Check with your own developers before buying wireless services, says Pimm Fox.

32 Leadership

It may be lonely on the wireless frontier, but not for long, writes Gus Tai.

33 Security

Would you buy security software from a firm that tries to gag researchers? Writer Ann Harrison wouldn't.

34 Take-Aways

COVER ILLUSTRATION: SERGE BLOCH

TAKING STOCK

"...Had the Sphinx opened its granite lips, surprise could hardly have been greater or more genuine; for this machine could transmit articulate speech from one point to another." ■ That's how an 1887 account describes Americans' reaction to the telephone, which, of course, was invented by Alexander Graham Bell. ■ However, it was the ever-innovative Thomas Edison who actually made the phone practical and easy to use. Before Edison (a brilliant and prolific inventor in his own right) had a go at Bell's brainchild, people had to yell to be heard. Edison's invention of the carbon telephone transmitter saved people's voices. ■ Like Edison, the 25 wireless innovators profiled in this special issue are early and aggressive fine-tuners of a rapidly evolving technology. They're also visionary risk takers. After all, it takes an undeniable leap of faith to commit time, expertise and sometimes large sums of money to something never tried before. ■ But the payoffs can also be spectacular. Cover story writer Alan Radding notes that Ford has cut its maintenance costs by more than half with a wireless call system *(page 14)*. Thanks to a wireless dispatch system, Mesa Energy Systems has grown from an $18 million commercial heating and air conditioning service provider to a $30 million company — without adding staff. Employee stress is down, too, writes Mary Brandel in our story on the benefits of untethering workers from offices *(page 28)*. Columnist Gus Tai acknowledges that, sure, it can be lonely on the wireless frontier, but being there early, like Colgate-Palmolive, means reaping the big rewards *(page 32)*. ■ Throughout this issue, *Computerworld ROI*'s Top 25 offer tips, tactics and strategies for winning with wireless technology. Our aim is to honor these pioneers plus provide readers with real-world starting points for continuing to innovate with a new technology that promises to take a lot less than 100 years to become as ubiquitous as Bell's telephone.

— *Julia King*

CONTRIBUTORS

MARY BRANDEL has been writing and editing feature stories about IT trends for 14 years. ■ **MITCH BETTS**, Washington bureau chief at *Computerworld*, has covered the role of technology in business, politics and society for more than 17 years. ■ **PIMM FOX** is *Computerworld*'s West Coast bureau chief and has reported on business for 18 years. ■ **MATT HAMBLEN** is a senior writer at *Computerworld* with a focus on wireless and mobile computing. ■ **ANN HARRISON** is a San Francisco-based journalist who reports on computer security and privacy for a wide range of publications. ■ **NINA LYTTON** is president of Crossroads-OSA Inc., a Boston consulting firm that works with IT departments to meet critical business challenges. ■ **THORNTON A. MAY** is corporate futurist and chief awareness officer at Guardent Inc., a security solutions provider in Waltham, Mass., and an adjunct faculty member at the John Anderson Graduate School of Management at UCLA. ■ **ALAN RADDING** has been a freelance writer for the past 15 years, specializing in business and technology. His stories regularly appear in a wide range of publications, including *Computerworld*. ■ **GUS TAI** is a general partner at Menlo Park, Calif.-based venture capital firm Trinity Ventures, which invests in enterprise software start-ups.

COMPUTERWORLD ROI

EDITOR IN CHIEF
Maryfran Johnson

EXECUTIVE EDITOR
Julia King

EDITOR
Ellen Fanning

CONTRIBUTING EDITORS
Mitch Betts
Pimm Fox

COLUMNISTS
Thornton A. May ***(thornton.may@guardent.com)***, Nina Lytton ***(nlytton@crossroads-osa.com)***, Gus Tai ***(gus@trinityventures.com)***

CONTRIBUTING WRITERS
Mary Brandel ***(thebrandels@hotmail.com.)***, Ann Harrison ***(ah@well.com)***, Matt Hamblen ***(matt_hamblen@computerworld.com)***, Alan Radding ***(www.technologywriter.com)***

MANAGING EDITOR
Bob Rawson

COPY EDITORS
Jean Consilvio, Jacqueline Day, Eugene Demaître, Jamie Eckle, Linda Frank, Michele Lee, Michael Parent, Monica Sambataro

DESIGN
kellydesign Inc.

ART DIRECTOR
Kelly McMurray

DESIGNER
Kristie Downing

VICE PRESIDENT/ MANUFACTURING OPERATIONS
Carolyn Medeiros

SENIOR GRAPHICS PRODUCTION COORDINATOR
Heidi Broadley

PRODUCTION MANAGER
Beverly Wolff

ADVERTISING COORDINATOR
Toula Karayan

COMPUTERWORLD DESIGN DIRECTOR
Stephanie Faucher

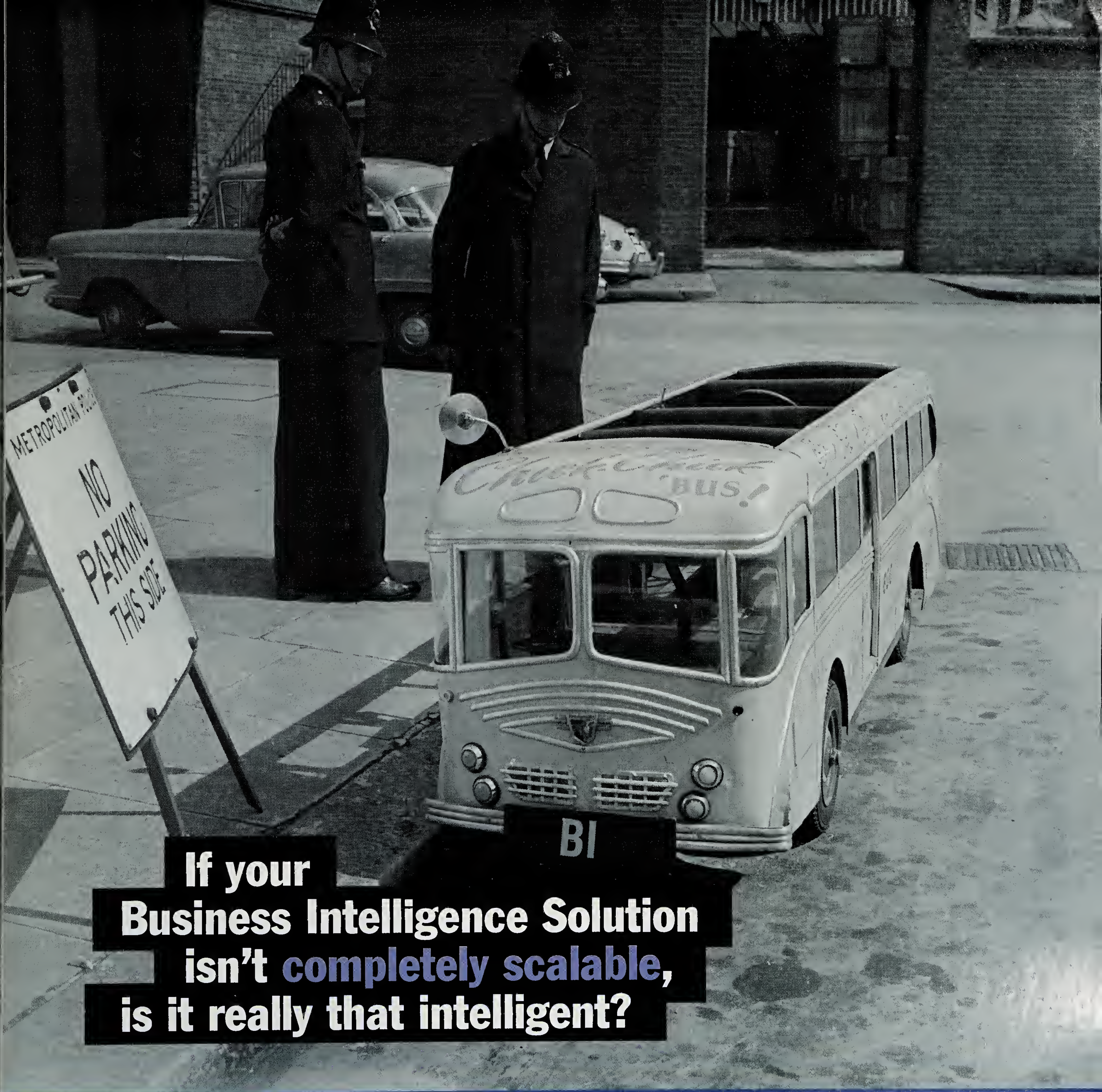
COMPUTERWORLD EDITORIAL DIRECTOR
Patricia Keefe

EDITORIAL OFFICE
500 Old Connecticut Path
Framingham, Mass. 01701
(508) 879-0700

SUBSCRIPTIONS
Call (800) 552-4431
Outside U.S. call: (740) 382-3322
Fax: (508) 626-2705
Internet: circulation@computerworld.com
Mail: Computerworld, PO Box 2043, Marion, Ohio 43305-2043

REPRINTS
Call Ray Trynovich at RMS Reprints, (717) 399-1900 or e-mail: sales@rmsreprints.com.

PHOTOGRAPH: FURNALD/GRAY



If your Business Intelligence Solution isn't completely scalable, is it really that intelligent?

If your business intelligence can't scale to continually larger demands you're not going to get very far. That's why you should be using WebFOCUS from Information Builders, the most useable, scalable and deployable Business Intelligence solution on the market today. WebFOCUS integrates and leverages data from all your disparate systems, and delivers it as meaningful information over the Web to an unlimited number of users. So now, you can act instantly and move without delay. Which, in today's competitive landscape isn't just smart, it's brilliant. **www.informationbuilders.com 1.800.969.INFO**

Information Builders WebFOCUS
From Data to Business Intelligence

©2001 Information Builders

TOP LINE

TIPS, TACTICS AND TIMELY INFO ABOUT TECHNOLOGY PAYBACK

EDITED BY
MITCH BETTS

info wastelands

Don’t Let Techies Rule Intranets

CORPORATE INTRANETS ARE TYPICALLY developed and run by the IT department, which makes sense from a technology perspective but may also explain why so few employees use them once they’re built.

Other departments representing broad user interests need to be on the planning team to make sure there’s useful content on the intranet, says Lisa Nash, an analyst at Outsell Inc., an information industry research firm in Burlingame, Calif.

“Until corporations begin to manage [intranets] as dynamic collections of content rather than static technological infrastructure, users will look elsewhere for their information,” Nash says.

Other departments that can play a role in making the intranet a living, useful destination include the communications, marketing and human resources departments, as well as the corporate library and the competitive intelligence unit. “From the value perspective, it’s imperative that intranets are built from a content-centric point of view, regardless of who leads the team,” Nash says.

Intranet Team Players

- Marketing/ communications
- Human resources
- Corporate library
- IT

dealmaking

Hidden Costs of IT Outsourcing

THE COST OF IT OUTSOURCING INVOLVES more than vendor fees. A study of 50 outsourcing deals — conducted by French academic Jerome Barthelemy and reported in the *MIT Sloan Management Review* — shows that companies are largely unaware of the hidden costs:

- Finding the vendor and writing the contract costs an average of $500,000, or about 3% of the average total outsourcing cost.
- There are hard-to-quantify transition costs. It usually takes about a year for the vendor to wean itself from dependency on the in-house IT staff.
- Managing the contractor costs an average of $300,000 annually.
- Companies rarely think about costs at the end of the contract, such as the price to switch vendors or bring IT back in-house.

So how do you reduce those hidden costs? Barthelemy says: Don’t outsource critical or idiosyncratic activities, spend more time researching vendors and hire managers with outsourcing experience.

Top 5

High Anxiety

CORPORATE SECURITY MANAGERS RANK THEIR BIGGEST WORRIES AS THE FOLLOWING:

1. Workplace violence
2. **Internet security**
3. Thoroughly screening job applicants
4. White-collar crime, fraud
5. Business interruption, disaster recovery

Source: 2001 survey of 220 corporate security managers by Chicago-based Pinkerton, a unit of Securitas AB

ILLUSTRATION: KATHERINE STREETER

weighty matters

Time to Charge Fair Shipping Fees

NO SURPRISE HERE: 63% OF ONLINE buyers say high shipping-and-handling charges deter them from purchasing online and are the leading cause of "shopping cart abandonment." The surprise is that 45% of online merchants claim they actually lose money on shipping and handling, according to Jupiter Media Metrix Inc., a research firm in New York.

The solution may lie in changing the way online retailers calculate the fees. Most charge by the dollar value of the order or the number of items purchased. But Jupiter says consumers would prefer that shipping-and-handling charges were based on the weight of the items. Why? Because they trust that measure, and it's intuitive that shipping would cost more for heavy items.

Charging by weight would also benefit the Web retailers, Jupiter says, because it would eliminate the risk of losing money on shipping heavy stuff.

S&H Charges
☑ By weight
☐ By dollar amount
☐ By number of items

The researchers conclude with this warning to online merchants: Don't try to profit by overcharging for shipping and handling, or you'll drive consumers to online rivals or off-line stores.

the list 10

Wireless Innovators' Top Concerns

1 **Reliance on emerging technology**
2 **Security/privacy of data**
3 **User acceptance of new systems**
4 **Cost**
5 **Scalability**
6 **Ergonomics of mobile devices**
7 **Standards**
8 **Reliability**
9 **Justifying return on investment**
10 **Choosing the right technology vendor**

Source: *Computerworld ROI* Wireless 25 surveys

talking head

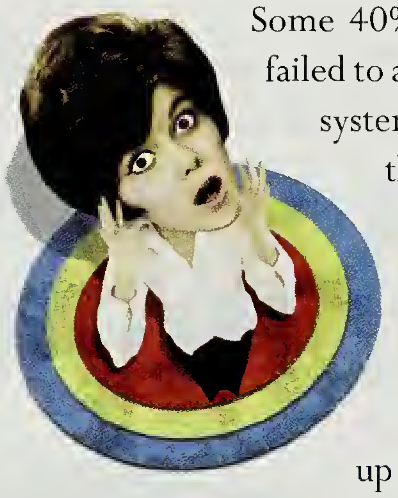
"Competition is not really company vs. company but supply chain vs. supply chain." — Warren Hausman, professor, Stanford University

ILLUSTRATION: JAMES YANG

never-ending story

Why ERP Projects Cause Panic Attacks

We know that enterprise resource planning (ERP) system projects are often the most difficult ones in the IT portfolio. But now we know just how difficult. One out of four ERP projects is over budget, and 20% are terminated before completion, according to a survey of 117 companies by The Conference Board Inc. in New York.



The projects that get finished are no picnic, either. Some 40% of the respondents say their ERP project failed to achieve business objectives even a year after the system was completed. When benefits are achieved, the ROI often takes six months longer than expected.

Why the lag? The study suggests there's a lot of pressure on IT project managers to go live with the system quickly — and then there's a post-implementation scramble to fix up the deficiencies. Three quarters of the surveyed companies reported a moderate-to-severe productivity dip following implementation. And for the first six months, support costs go up, not down.

why they don't buy

Primary Hurdles to Mobile E-Commerce

Laptop users are worried about security, cell-phone users don't like the complicated navigation, and PDA users say wireless e-commerce is too slow.

	Cell phone	PDA	Laptop
Security concerns	18%	18%	37%
Complicated navigation	24%	14%	2%
Takes too long	13%	19%	15%

Source: San Francisco-based Telephia Inc. survey of 3,600 wireless device users

research roundup

Around the World In 60 Seconds

- Companies could save 20% to 50% on their network equipment if they shook up their incumbent vendors and got competitive bids. [Gartner Inc., Stamford, Conn.]

- Outsourcing is hot in the U.K., with 22 megadeals (contracts valued at more than $1 billion) last year. [IDC, Framingham, Mass.]

- General Electric Co. estimates that 30% of its purchases, worth $14 billion, will be conducted via online reverse auctions in 2001 — generating more than $600 million in cost savings. [Forrester Research Inc., Cambridge, Mass.]

- One in every four computers in the U.K. has been physically assaulted by its owner. The abuse includes smacking the keyboard or giving a sharp slap to the monitor. [Novatech Direct Ltd., Portsmouth, U.K.]

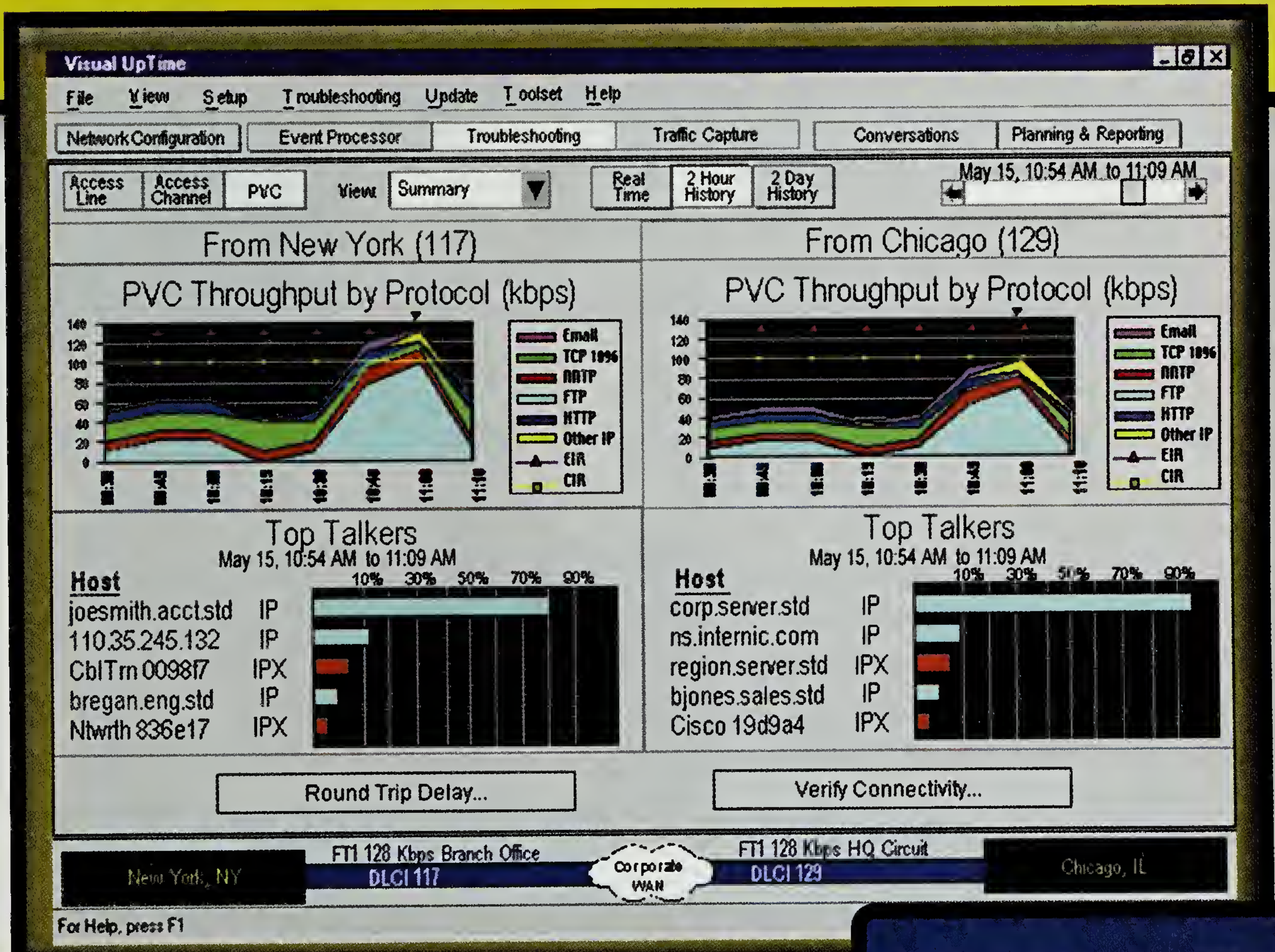
- An influential insurance company is imposing a 5% to 15% surcharge for clients who use Windows NT, because of its security vulnerabilities. [Gartner]

- Nearly 60% of fast-growth companies are buying directly from other businesses over the Internet, but only 25% are engaged in B2B selling over the Internet. [PricewaterhouseCoopers' "Trendsetter Barometer," New York]

ILLUSTRATION: FRANCISCO CACERES, PHOTOGRAPH: PHOTONICA

Plan for UpTime, or Pay in Downtime

Discover how Visual UpTime® improves WAN availability and helps lower total cost.



Top Talkers
May 15, 10:54 AM to 11:09 AM

Host	
joesmith.acct.std	IP
110.35.245.132	IP
CblTrn 0098f7	IPX
bregan.eng.std	IP
Ntwrth 836e17	IPX

Top Talkers
May 15, 10:54 AM to 11:09 AM

Host	
corp.server.std	IP
ns.internic.com	IP
region.server.std	IPX
bjones.sales.std	IP
Cisco 19d9a4	IPX

In today's business environment, your WAN resources are tasked beyond the limit. Add in your steadily increasing applications and traffic, and you have a network disaster waiting to happen—after all, poor network performance means lost customers and, ultimately, revenue. For you, preventive WAN service management isn't a luxury—it's a bare necessity. You need Visual UpTime.

Visual UpTime automates the collection, interpretation, and presentation of WAN service management information, allowing you to optimize network performance while reducing overall network costs. And with Visual UpTime's real-time monitoring and troubleshooting, you'll see—and fix—impending service degradation before your users are affected. In fact, just by immediately pinpointing inefficiencies such as misconfigured CIR, excessive bursting, latency issues, congestion and intermittent local loop problems, Visual UpTime can increase bandwidth availability up to 40%. That's why it's the de facto standard for managing frame relay and ATM networks.

Visual UpTime is deployed in more than 2,500 enterprises and 150,000 locations running mission-critical applications like yours. Discover what they already know—Visual UpTime gives you more uptime. And isn't that what you need?

See how much uptime Visual UpTime can give you. Visit www.visualnetworks.com/roi and download our interactive presentation.

VISUAL
NETWORKS®

www.visualnetworks.com/roi
1.800.240.4010

Join our FREE Visual Networks Webinars.
Visit http://us1.webex.com/visualnetworks
to register now.

©2001 Visual Networks Technologies, Inc. All rights reserved. Visual Networks, the Visual Networks logo, and Visual UpTime are registered trademarks of Visual Networks Technologies, Inc.

BY THORNTON A. MAY

Ignorance Without Bliss

What you don't know about the security of wireless technology can hurt you

The Fourth Amendment to the U.S. Constitution provides that "the right of the people to be secure in their persons, houses, papers and effects, against unreasonable searches and seizures, shall not be violated." Does being sent an unsolicited commercial message on a wireless device constitute such a search? After all, the location-based service vendor is searching for your business, searching for the itch you need to scratch. Is the restaurant that "senses" you are near and sends you a menu special on your BlackBerry pager violating your constitutionally granted civil rights?

People in our society need to better understand and more broadly discuss technology's impact on our shrinking realm of guaranteed privacy. The Federal Communications Commission now requires that all wireless companies be able to pinpoint within 50 meters the location of people who call 911 on their cell phones. This has placed the wireless industry in the cross hairs of privacy advocates, Ralph Nader wannabes and muckrakers in search of a microphone. At the base of all this turmoil is monstrous consumer ignorance of the issues at hand.

Almost every privacy and security book has buried deep inside it a paraphrase of the ominous "They think they are whispering, but really, they are broadcasting" warning. In his dissent to a very important decision in the *Kyllo v. U.S.* case, in which police used an outside thermal scanner to detect marijuana growing inside an Oregon man's house, Supreme Court Justice John Paul Stevens argued, "What a person knowingly exposes to the public, even in his own home or office, is not a subject of Fourth Amendment protection."

Computer scientists will tell you that everyone knows wireless isn't secure. If that's true, then is all information that we place in the wireless domain public information?

Who is responsible for telling the protowireless customer that out-of-the-box, off-the-shelf devices aren't necessarily secure? I tend to give businesses the benefit of the doubt as they try to balance the need to generate quarterly profits with the mandate to be socially responsible. Having said that, I'm disappointed that companies are dancing around the security issue. When a wireless vulnerability was recently publicized, a spokesman for a major wireless device manufacturer sought to downplay the potential risk, explaining, "These were sophisticated users using fairly sophisticated systems." This makes me feel much better. I would hate to think that my privacy was being compromised by dullards wielding cheap gear.

The bottom line is that nothing — no government agency, no piece of software or hardware — will ensure your privacy. Privacy isn't something someone gives you. In our digital world, it's something you give yourself.

So first, get a better handle on your personal information. What's private and what isn't? Then understand the information risk associated with the different devices you use. Highly private information shouldn't pass through high-risk devices. In the world of wireless, you have to be your own data sheriff. **ROI**

ILLUSTRATION: SUSY PILGRIM-WATERS

BY NINA LYTTON

Web-Enabled Everything

Wireless access breathes new life into everyday products and services

In a recent Crossroads-OSA poll of 200 executives, 75% identified wireless as the Web access method most likely to change their lives. Forty-five percent said they believe that personal wireless access will be the method that most significantly changes their customers' lives.

Obviously, enthusiasm for wireless technology is widespread. But that fervor is filtered through the ROI lens. In contrast to their behavior during the dot-com heyday, executives are now asking questions *before* making investments.

Wireless information access is beginning to pay off in two areas. The first — achieving greater productivity or lower costs — is a straightforward cost/benefit equation. The second — transforming the customer experience — is a proposition with greater risks and higher rewards.

A traveling sales rep can make better use of a customer's time by checking pertinent information en route to a meeting. Teachers, physicians, factory personnel and even big-company managers who move around a campus as they work can increase their productivity by accessing data, not just voice, over the air. Wireless can even play a critical role when people are in the same room. For instance, lawyers, bankers and clients can use wireless instant messaging or e-mail to communicate during negotiations.

In the personal productivity setting, wireless access can be most easily justified for highly transient information. This type of information changes frequently in meaningful ways, and there's material benefit from up-to-the-second access. Access to inventory and competitive price data, for example, can help sales reps and managers close a quarter with the highest possible profits.

Transforming the customer experience with wireless access can occur in several ways. The most straightforward approach is to provide information to customers sooner. British Airways has added mobile phones to complement its Web- and kiosk-based self-service channels. In so doing, the airline has improved the efficiency of its check-in process and reduced staff. By providing information anywhere, at any time, companies encourage customers to use their services more frequently, thereby increasing revenue.

The market for location-based services such as local maps or retail promotions increases dramatically when they can be accessed wirelessly. Even vending machines can use wireless to optimize product assortment and pricing.

Wireless information access can also transform products. Users of Nokia's Communicator devices can make calls and read e-mail. They will soon be able to play music and watch video, too. United Technologies subsidiary Carrier is developing the first Internet-enabled air conditioner and has teamed with IBM on a wireless remote monitoring and control service called Myappliance.com.

As wireless Internet devices change shape and size, we're only a step away from Internet-enabled anything. With the wireless Internet, familiar products could sing a different tune. Wireless interactive Barney, anyone? ROI

ILLUSTRATION: DAVID PLUNKERT

When a company was totally self-sufficient, it used to be a sign of strength. But now it is just the opposite. Welcome to the new relationship economy, where success depends on the effectiveness of your connections.

Cap Gemini Ernst & Young can help you plug into an extended network of vendors, suppliers, customers, and yes, even competitors. In addition to being integrated internally, we make certain all your systems and processes are perfectly connected with the outside world. So you can forge new relationships and help transform the rules as you go along.

Why work with us? With over 60,000 people worldwide, we are one of the top global management and IT consulting firms. We are specialists at connecting you with your value chain — from IT infrastructure to business processes to B2B marketplaces. In fact, we are helping to build the largest digital exchange ever.

So join the liberation and watch your business take flight.

CAP GEMINI ERNST & YOUNG

www.cgey.com

MANAGEMENT CONSULTING – SYSTEMS TRANSFORMATION – INFORMATION TECHNOLOGIES

©2001 Cap Gemini Ernst & Young. All trademarks, trade names and service marks mentioned and/or used belong to their respective owners.

WINNING AT WIRELESS

Who They Are

Public companies	56%
Private companies	16%
Nonprofits/ Government	28%

Base: The Wireless 25

How Much They Spent

Average cost of project: **$2,003,727**

Base: 19 of the Wireless 25

MEET THE VISIONARY RISK-TAKERS WHO are leading the way across the uncharted expanse of the wireless landscape. From a New England college to a Finnish railway, these pioneers are as diverse a group as they come. What they share is a quest to innovate with wireless technologies to accomplish their strategic business goals. Each of these 25 user organizations has distinguished itself as a front-runner in successfully employing emerging and rapidly evolving wireless technologies. Their strides and struggles are chronicled on the following pages.

When They Expect Payback

Getting payback now	52%
In one to two years	28%
In two to five years	12%
Never	8%

Base: The Wireless 25

LEADING THE WAY

TODAY'S MOST INNOVATIVE WIRELESS APPLICATIONS MAY SEEM MUNDANE,

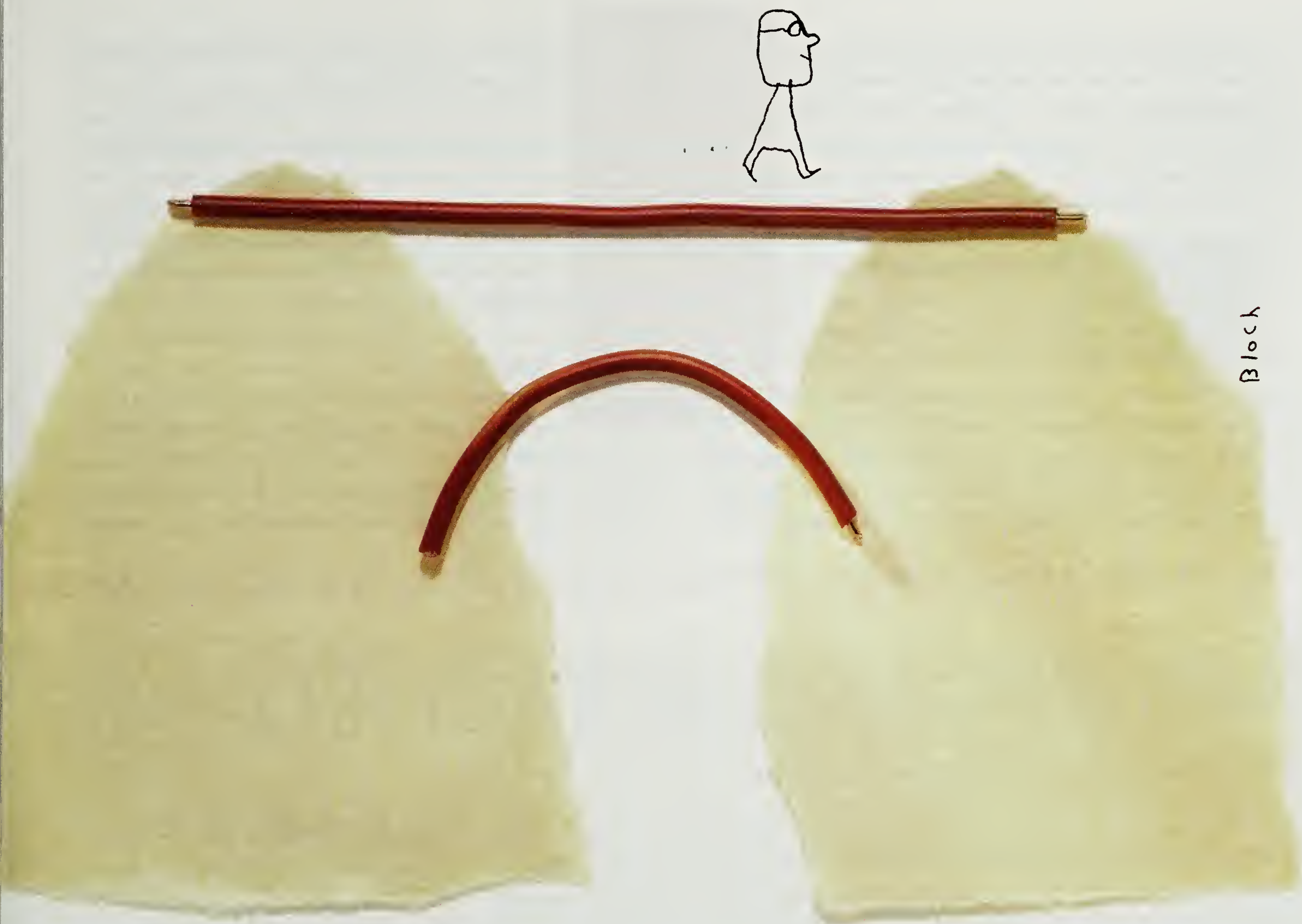
BY ALAN RADDING

Some of the most successful innovations seem almost mundane. Velcro provides a convenient way to hold things together. A few twists and turns in a piece of wire and you have a paper clip.

On the surface, today's most innovative wireless applications might also appear decidedly ho-hum — confirming a reservation, checking stock prices, alerting passengers to flight delays. Yet, they are innovations nonetheless: They do what hasn't been done before in their respective industries, providing what customers want and setting a standard that rivals must scramble to meet. And they are successfully employing a rapidly evolving technology still at the earliest development stages.

The promise of wireless — the ability to interact with people or systems at any time from any place — will eventually produce more mind-boggling innovations. But until the technology is mature, until the infrastructure is built out, until the standards, devices, interfaces and everything else required to achieve greater usability, reliability and consistency arrive, those stunning innovations will probably have to wait.

At this stage in the game, wireless technologies are addressing the most obvious needs. "That's why you're seeing wireless applications used widely in the transportation industry to track packages and for dispatch and notification," says Alan Reiter, an analyst at Wireless Internet and Mobile Computing in Chevy



YET MOST GENERATE A POSITIVE RETURN ON INVESTMENT IN A YEAR OR LESS

Chase, Md. These applications deliver an immediate benefit, typically generating ROI in a year or less, he notes.

The largest firms to make *Computerworld ROI*'s list of wireless innovators certainly fall into this group. They are deploying wireless applications that are extensions of the things they already do in the wired world. Fidelity Investments, for example, is providing customers with wireless access to account information through Fidelity Anywhere. United Networks, a wholly owned subsidiary of United Air Lines Inc., is alerting the airline's passengers to changes in the status of their flights. Thrifty Car Rental lets its wireless customers make and confirm reservations. Producers Lloyds Insurance Co. in Amarillo, Texas, lets agents access the account information of its farmer customers to file claims and authorize payments from the middle of cornfields.

On the industrial side, $27 billion United Parcel Service Inc. has launched UPScan, which uses wireless technology to standardize its handheld terminals and streamline data gathering. Pfizer Inc., a $30 billion pharmaceutical giant, has turned to wireless to improve manufacturing and warehousing. The U.S. Army and $169 billion Ford Motor Co. have deployed wireless devices to help track assets such as equipment, vehicles, containers and materials.

ILLUSTRATIONS BY SERGE BLOCH

All of these applications may seem routine, even trivial, yet the impact they are having is substantial. In financial services, almost every major investment firm is now playing catch-up to Fidelity and has a wireless initiative under way. In the car rental business, Brian Carpenter, Thrifty Car Rental's vice president of marketing, says, "A number of our competitors have followed us," including Dollar Rent A Car, Thrifty's sister company.

And Ford recognized that its competitors would follow right behind if its wireless initiative worked as expected, so it took an equity position in its technology partner, Santa Clara, Calif.-based WhereNet Corp. "We've got a head start, and we get a share of the revenue when others buy this technology," says Mark Wrubel, a project manager at Ford. If that doesn't dissuade competitors from following Ford's lead, at least they will be subsidizing its pioneering effort when they do, he adds.

How They Measure ROI*

- Customer loyalty
- Customer satisfaction
- Customer retention
- Employee retention
- New assets
- Brand loyalty
- Production time
- Leadership position
- Job performance
- Labor costs
- Inventory turns

*(Other than revenue)

All of these projects latched onto emerging wireless technology to address problems that the companies had wrestled with for a long time, whether it was customer service or shop-floor efficiency. Although none of the innovators claims any major breakthroughs, each has deployed a wireless application that contributes to its bottom line.

FIDELITY

Customers led Boston-based Fidelity Investments to launch its first wireless service, Instant Broker, in October 1998. At that time, a survey of Fidelity customers revealed that 40% believed they had missed out on investment opportunities because they were away from a wired

ALL OF THESE PROJECTS LATCHED ON TO EMERGING WIRELESS TECHNOLOGY TO

NO STRINGS ATTACHED

How the Top 25 are winning with wireless

Computerworld ROI's innovators are tapping still-emerging wireless technologies for everything from making, selling and shipping products faster and cheaper to ensuring that the neediest patients are seen first at hospital emergency rooms. What's notable in many cases is the relatively low price tag of these projects, which frequently leverage a company's existing technology infrastructure to make an already good thing even better. The following profiles zero in on how and why the Wireless 25's winning projects came about and detail how the innovators tally the return on their investments.

Automotive

FORD

Redford, Mich.

www.ford.com

See page 20

Aerospace

UNITED AIR LINES

Chicago

www.united.com

See page 18

Chemicals/Energy

CELANESE CHEMICALS-AMERICAS

Dallas

www.celanesechemicals.com

Customer calls to the chemical maker used to trigger something like a relay race. Sales reps would respond by calling a home-office customer service representative who had network access. After retrieving the necessary product information, the home office would call back the sales rep, who would then call back the customer. The process took anywhere from four hours to a full day.

Now, salespeople use handhelds linked to a Web-based SAP R/3 system to get real-time information and deliver it to customers on the spot. Celanese expects to see a rise in customer satisfaction as a result of the fast response times and one-on-one service, says William Schmitt, director of business enablement at Celanese, a division of Frankfurt, Germany-based Celanese AG. The company also expects to add other wireless capabilities and launch a pilot system in Europe and Asia.

MESA ENERGY SYSTEMS INC.

Irvine, Calif.

www.emcorgroup.com

See page 28

TOP 25 ILLUSTRATIONS: TERRY ALLEN

channel and didn't have access to market information. Instant Broker let active traders monitor activities affecting their accounts through pagers. The next year, Fidelity added two-way capabilities, enabling traders to initiate transactions and receive information.

Today, Fidelity has expanded Instant Broker into Fidelity Anywhere, which offers an array of services beyond retail brokerage. The wireless service, which boasts more than 92,000 registered users and is growing by more than 3,000 users per month, allows customers to manage their 401(k) accounts, charitable donations, insurance and more. Soon, it will include Fidelity's Boston Coach limousine service and even its Seaport Hotel, enabling users to book and confirm reservations using wireless devices. Moving beyond pagers, Fidelity Anywhere supports devices from Palm Inc. and other vendors as well as General Motors Corp.'s onboard system, OnStar.

"We want to be on as many devices as possible," says Joseph Ferra, Fidelity's chief wireless officer.

Figuring out the payback from Fidelity Anywhere isn't clear-cut. "Our overall objective is better customer service," which is difficult to place a value on, Ferra notes. There is no charge to access Fidelity Anywhere. Even non-Fidelity customers can access it for basic market information. Fidelity Anywhere's primary value is to draw users into deeper relationships and increase customer loyalty through the use of more Fidelity services. Still, the company has tried to pinpoint specific gains. For example, based on a Fidelity study, Ferra estimates that about one-third of Fidelity Anywhere's registered users represent new Fidelity accounts.

Fidelity's wireless brokerage service attracts 3,000 new users per month.

More important is the "stickiness" the wireless services achieve. "Once a customer subscribes, they stay. They really like

SOLVE PROBLEMS THAT THE COMPANIES HAD WRESTLED WITH FOR A LONG TIME

Education

BOSTON COLLEGE

Chestnut Hill, Mass.

www.bc.edu

Founded in 1863, Boston College epitomizes the classic New England university, complete with tree-lined walkways and spired buildings. It was those buildings, in fact, that helped Henry Perry, director of network services, persuade school administrators to fund an ambitious wireless LAN project.

Ripping apart ceilings in structures almost a century old wasn't an option. "One of the selling points [to administrators] was not to have to hard-wire those buildings," says Perry, who worked with Rochester, N.H.-based network vendor Enterasys Networks Inc. to install 350 access points throughout the campus, including the library, common areas and outdoor quadrangles. The idea was to complement the existing network with wireless coverage in areas where it was difficult or not desirable to run wire, says Perry. Students, faculty and administrators can now use their laptops to connect to the school network and the Internet to register for classes, view curricula, e-mail one another and collaborate on projects as they roam about the 116-acre main campus.

Perry and network engineer Brian David will install access points in the residence halls and finish work in administrative buildings by the end of this year.

Financial Services

ETRADE GROUP INC.

Menlo Park, Calif.

www.etrade.com

ETrade began offering an integrated brokerage and banking service to wireless customers in May last year. Among other things, the system's personalization feature gives users the ability to customize stock quotes and other information they wish to receive without logging on to the Internet-based system each time. Mobile ETrade's benefits have included the creation of incremental transactions and consolidation of assets, and an increase in loyal and new customers. ETrade executives say they expect to easily add programs to new wireless platforms as they emerge, allowing the company to remain a leader in the industry.

FIDELITY INVESTMENTS

Boston

www.fidelity.com

See page 16

HARRIS BANK

Chicago

www.harrisbank.com

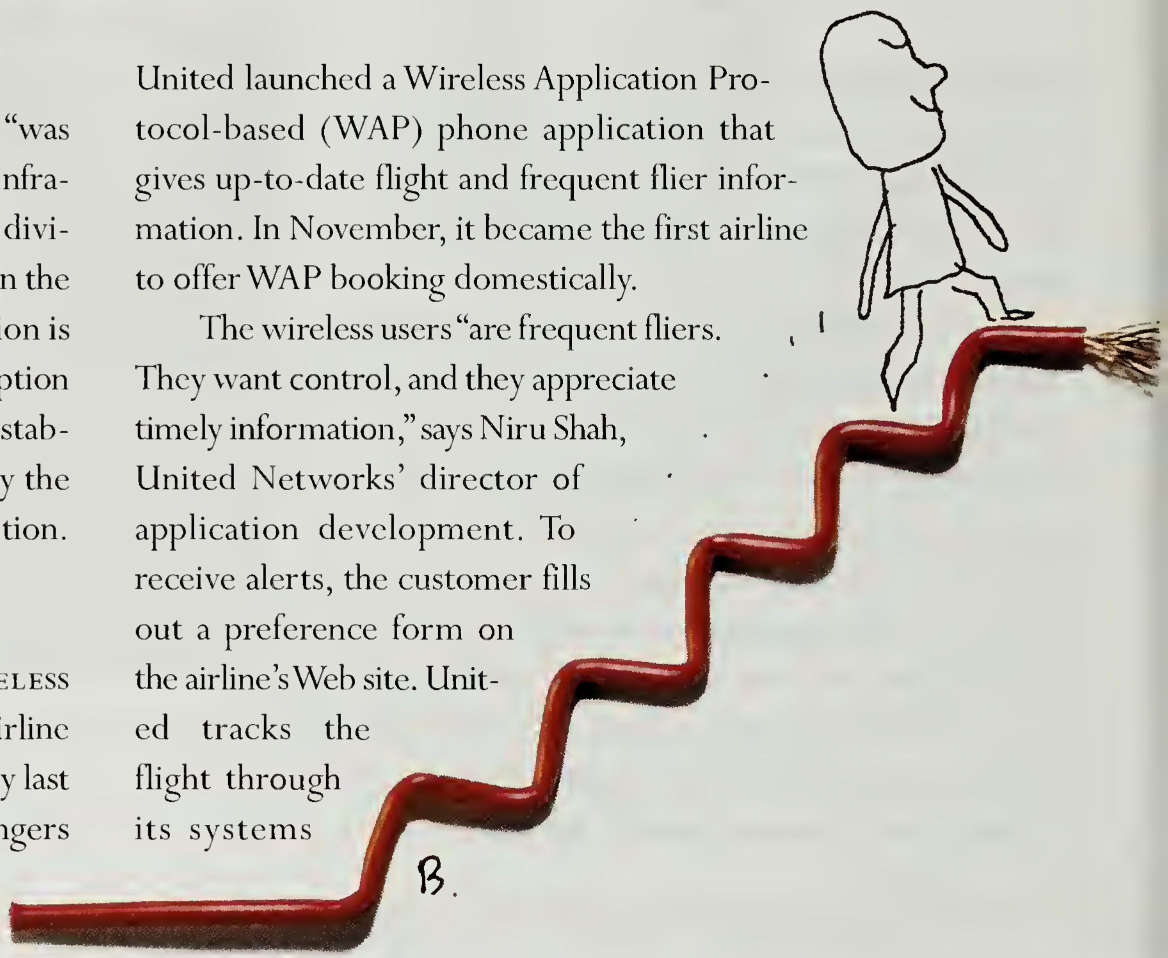
Thanks largely to its relationship with parent company Bank of Montreal, Harris Bank was the first U.S. financial institution to offer wireless banking services through mobile phones and other handheld devices. Harris Wireless, a financial concierge service, lets customers transfer funds between accounts, pay bills, view transactions in real time and access stock-watch lists, news and weather information. The costs associated with launching the project were comparatively low because Harris was able to the convenience and control," Ferra says.

In any case, the ROI should come fast. Fidelity Anywhere "was not a big investment. We were leveraging a lot of the existing infrastructure," says Ferra. And being first is already paying big dividends, especially when it comes to beating the competition in the crucial battle for wireless gateway menu positioning. "Position is critical. There are only nine keys that can be used as a menu option on a telephone," Ferra points out. Fidelity moved fast to establish relationships with the big wireless gateways operated by the major service providers to secure a one-keystroke menu position.

UNITED AIR LINES

CHICAGO-BASED UNITED AIR LINES ALSO ADOPTED WIRELESS early. In 1999, the $19.3 billion company became the first airline to offer real-time flight information on the Palm VII. In January last year, it introduced Proactive Paging, which notifies passengers of changes in their flight status. Since its inception, use of Proactive Paging has more than tripled. In July last year, United launched a Wireless Application Protocol-based (WAP) phone application that gives up-to-date flight and frequent flier information. In November, it became the first airline to offer WAP booking domestically.

The wireless users "are frequent fliers. They want control, and they appreciate timely information," says Niru Shah, United Networks' director of application development. To receive alerts, the customer fills out a preference form on the airline's Web site. United tracks the flight through its systems



leverage the infrastructure of Bank of Montreal, which initiated wireless services in 1999. Later this year, Harris will provide wireless customers with real-time stock-trading services and direct access to their portfolios.

Government

CITY OF FAIRFAX, VA.

Fairfax, Va.
www.ci.fairfax.va.us

The Transportation Department in Fairfax, Va., is looking to cut waiting times and boost ridership on public buses by using a wireless system that delivers real-time bus arrival and departure times to transit stops.

Twelve transit buses equipped with Global Positioning System and automated vehicle location systems transmit up-to-the-minute location and schedule information that passengers can view from a variety of display devices, including Internet phones, personal digital assistants (PDA) and bus-stop monitors. Fairfax Transportation Director Alex Verzosa says that the system, powered by NextBus, will free up phone support employees, who frequently field bus schedule calls, and let transit managers monitor driver performance.

The city also plans to use the system to collect route data that can be used to make future service improvements.

CITY OF PAINESVILLE, OHIO, POLICE DEPARTMENT

Painesville, Ohio
www.painesville.com

The Police Department in Painesville, Ohio, recently launched a wireless project that lets officers use an in-car PC to complete incident reports and check state records from the road. The result: Officers are spending more time patrolling the streets and less time doing paperwork.

The project employs radio frequency technologies to transmit state driving license and criminal record information to the cruisers. It also uses high-speed spread-spectrum technology to transmit officers' reports from patrol cars to headquarters. Officers generate reports using a custom application loaded into their cars' PCs and upload them when returning to the station.

Sgt. David R. Luhta estimates that the extra time Painesville's force now spends in the field is equal to adding two or three officers to its 34-member patrol staff.

CITY OF RICHMOND, BRITISH COLUMBIA

Richmond, British Columbia
www.city.richmond.bc.ca

A variety of wireless handsets provides Richmond city crews anywhere-access to a proprietary database that contains information about the city's flood defense systems. The database, which itself receives wireless data from transmitters installed on 180 city water pumps, temperature sensors and water-level monitors, tracks variables such as pump performance, street temperatures and water and sewage levels.

The ability to query the database from the field allows mobile city crews to prioritize system maintenance tasks according to problem areas requiring the most immediate attention. The database can also "push" and notifies the passenger based on specified preferences. The passenger may be alerted to delays or changes in departure gates — whatever they specify. "The customers have really embraced this," she declares, noting a 2,800% increase in usage last year.

Like Fidelity, United's primary objective is customer satisfaction. "It is a way to build customer loyalty and retention," Shah says. But it also provides a distinct advantage. "In focus groups, customers make it clear that this helps persuade them to fly with us," she says. Other airlines have copied United's initiative, but Shah says United can stay ahead by rolling out new services.

Also like Fidelity, the cost of the wireless application wasn't a big factor. The application takes advantage of information captured by the airline's existing systems. "Cost was not the [limiting] factor. The value of the benefits outweighed the costs," says Shah. Still the company took a chance on wireless. "Any time you are dealing with emerging technology, there are risks," she adds.

> **"At the time it was instituted, none of our competitors had wireless technology available. Most have still not figured it out."**
> **— Gerald Buckley, director of Internet marketing, Thrifty Car Rental**

THRIFTY CAR RENTAL

"Our goal is to make it simple to book a car. That means using any manner of access the customer wants," says Carpenter at Thrifty Car Rental, a unit of Tulsa, Okla.-based Dollar Thrifty Automotive Group. When consultants from Dallas-based Perot Systems Corp. already on-site at Thrifty surprised Carpenter with a prototype of a system offering wireless Palm access to its reservation system through the company's Web site, he funded full development on the spot. "It fit with our strategy for easy accessibility," he recalls. The wireless application, developed by project leader Ron Salach for less than $100,000, would let customers reserve cars and confirm reservations anytime, from anywhere.

About 30% of Thrifty's customers reserve cars through its Web site. To date, about 1,500 people, or about 15% of visitors to the wireless section of Thrifty's Web site, have downloaded the application that enables them to interact with the Thrifty Web site

critical information. If it detects that a neighborhood's water or sewage height has reached a dangerous level, for example, it can transmit an alert to wireless handsets, allowing safety crews to respond faster.

MIAMI-DADE BUILDING DEPARTMENT

Miami

www.co.miami-dade.fl.us./bldg/

Thanks to the recent wireless efforts of the Building Department of Miami-Dade County, Fla., building contractors can now access county inspection results in as little as 10 minutes instead of two days. The expedited results process translates into money- and time-savings for contractors and, the building department hopes, more construction investments within the county.

The streamlined results process came after the building department outfitted its field inspectors with wireless handsets. While still in the field, inspectors can now directly submit their findings to central servers for immediate publication on both the department's Web site and a voice response system. The process eliminates the need for permit clerks to enter inspection results from hard copy into computers, which saves time and frees clerks to perform other permit-related functions.

NASA'S GODDARD SPACE FLIGHT CENTER

Greenbelt, Md.

www.gsfc.nasa.gov

NASA's Goddard Space Flight Center's Spacecraft Emergency Response System (SERS) employs advanced automation, expert systems and software agents to monitor the performance of satellites worth $50 million to $100 million.

When the system identifies potential faults or emergencies, it sends detailed wireless alerts to the most appropriate personnel and facilitates remote interaction among their wireless devices, including two-way pagers, Internet phones and PDAs.

From its start in 1996, SERS's main aim has been to "reduce the cost of spacecraft mission operations without increasing the risk of losing the spacecraft or reducing the throughput of scientific data," says Julie Breed, branch head at the center. Prior to the automated monitoring, satellite mission control was typically an expensive enterprise, requiring eight or nine engineers to take turns monitoring around-the-clock. Now, it requires only a single engineer from 9 a.m. to 5 p.m, Monday through Friday.

That saves thousands of hours of labor on each mission. The project, Breed says, "has already paid for itself many times over."

The first SERS mission, TRACE, which has been operating for more than three years, shows that the system can reliably handle its load. To monitor the health and safety of TRACE, the system uses a combination of networks to examine more than 5,000 satellite parameters six or seven times each day.

Recent analysis of SERS logs shows that the system has alerted on-call staff to 3,300 through their Palm devices. Carpenter assumes most downloads are by existing Thrifty customers.

"We think most folks reserve a car by phone or on the Internet and then confirm it using the Palm," he says. The company doesn't track whether a user is accessing the site through a Palm or a wired connection. But Carpenter doesn't worry about pinning down a hard ROI figure. "How do you measure the value of giving customers easy access to you?" he asks. When he saw rivals rolling out wireless access, Carpenter knew Thrifty made the right move.

Ford's wireless call system was **half the cost** of a wired system, and **installation time** was **75%** faster.

FORD

Wireless innovation at Ford started with the most mundane problem — returning containers that held parts used on the production lines. When empty, they had to be collected. But this was just part of a bigger assembly-line process. To complicate matters, the line is a brutal environment crammed with machinery, cables and systems.

The wired call system proved costly, inflexible and plagued with problems. The Ford team charged with solving these issues turned to radio frequency for a wireless solution. "We talked with the best research labs in the country and couldn't find anything at an affordable price," says Ford's Wrubel.

By luck, the team stumbled onto WhereNet, a small company that offered a compact battery-powered wireless tag that could be easily placed on items. Once in place on an empty parts container or at a convenient spot along the assembly line, it communicates with computers to send pickup or replenishment orders. The tag incorporates a button that an operator can push to trigger a message. A very low-powered device, the tag contains a battery that lasts up to eight years. After months of test-

NOT ALL INNOVATORS WORRY ABOUT PINNING DOWN A HARD ROI FIGURE;

potential problems, only 12 of which were serious enough to force a return to base.

Another half-dozen new satellite missions have committed to SERS upon launch. According to Breed, "A mission now has to justify why it would not use a system like SERS."

U.S. ARMY, EUROPE

Mannheim-Friedrichsfeld, Germany

The U.S. Army, Europe (Office of the Deputy Chief of Staff, Logistics) employs an advanced, wireless Automatic Identification Technologies (AIT) Network to track critical parts and supplies in transit to operations in and around Europe. AIT uses a combination of automated RF and satellite-tracking technologies to monitor supply shipments and troop movements between Germany and the Balkans.

The system publishes the asset location information it gathers through a secure Internet feed to managers in charge of distributing and deploying assets to field operations, such as the security forces operations in Bosnia-Herzegovina. The project supports a long-term U.S. Armed Forces commitment to enhance the efficiency of global supply chains through improved logistics operations.

"The AIT Network is presently recognized as the most extensive RF identification and satellite-tracking network system in the free world in terms of investment in commercial hardware and software, and the yearly support costs in Europe and the U.S.," says AIT Branch Chief Thomas F. Young.

Prior to AIT RF and satellite-tracking programs, the military managed supply shipments within individual organizations. Now, under a unified tracking system, service organizations have better information on inventory in the pipeline.

For example, a commander in Kosovo can "see" where in the supply pipeline in-bound helicopter rotor blades are and doesn't have to do a panic reordering because he lost sight of the shipment.

Health Care

OAKWOOD HEALTHCARE INC.

Dearborn, Mich.

www.oakwood.org

Oakwood Healthcare guarantees all incoming patients that they'll see a physician within a half-hour. But now that hospital admitting clerks use handheld devices to register patients and wirelessly access their records, it often takes less time than that.

Oakwood's $100,000 wireless project includes a wireless LAN that affords physicians, nurses and other staffers at its Annapolis Health Center easier, faster access to patient data. This translates into faster treatment, since clinicians can access information from a patient's bedside, rather than travel to a nurse's station to read from handwritten charts.

"Were hitting around a 20-minute turnaround time," says Dan Paton, information services adviser. The project also supports wireless voice headsets, which improve clinicians' mobility.

ing and refinement, Ford finally had a solution it could use.

"We tried it side by side with the old wired system we had been using in one plant, and everybody liked the wireless system better," says Wrubel.

The primary wireless application is parts replenishment, but the tags also can be used to collect containers and even locate vehicles on the lot. "One plant is thinking about it for garbage pickup instead of continuously driving around looking for garbage to pick up," Wrubel says. Since the success of the pilot, 25 plants have adopted the wireless system for parts replenishment.

Compared with a wired call system, the wireless application is a bargain, costing $500,000 to $1 million less to install and maintain, Wrubel reports. Another benefit is that it can be installed in one quarter of the time required to install a wired system, which means new vehicle model launches and assembly-line rebalancing operations can be done in a fraction of the current time with virtually no additional capital expenditure for hardware and equipment. The wireless system also speeds inventory replenishment.

> If its wireless initiative succeeded, **Ford knew the competition would follow right behind,** so the car company took an equity position in its wireless technology provider.

UNITED PARCEL SERVICE

ATLANTA-BASED UPS ALSO TURNED TO TECHNOLOGY RIGHT OUT of a research lab for the wireless portion of UPScan, a companywide, global initiative to streamline and standardize all in-building scanning hardware and software. For package tracking, UPScan will consolidate multiple scanning applications into one while maintaining interfaces with critical control and repository systems. The project is part of a reported $100 million upgrade of its wireless infrastructure. UPS began working with wireless

YOU CAN'T MEASURE THE VALUE OF GIVING CUSTOMERS EASY ACCESS TO YOU

Next year, the wireless project will be expanded to Oakwood's three other hospitals. There's also a plan to give patients and visitors wireless laptops to access the Internet. Patients and visitors will pay a fee to use the system, which will help quicken Oakwood's return on investment.

Hospitality/Travel

AVECRA OY

Helsinki, Finland

www.avecra.fi

Avecra Oy, the catering services provider for Finland's national railway, uses a year-old wireless system to transmit real-time sales and inventory data between moving railway dining cars and its central computer. Onboard mobile devices, such as handheld PDAs used by waiters, are equipped with Espoo, Finland-based NetSeal Technologies' RoamMate software. This software continually searches for connection points to the Internet as trains make their way along their routes. When a connection point is found, real-time inventory and other data is securely transmitted to Avecra's headquarters-based server. The wireless system has reduced time and labor costs and enables near-real-time updates to accounting records and quick response to changing inventory needs. Based on data transmitted from the restaurant cars, Avecra can replenish quick-selling menu selections at intermediate stations.

"So far as we know, we are the first to implement this kind of system in this kind of environment," says Matti Saari, Avecra's financial manager. He says the company expects to see a positive financial return on its $180,610 investment in the wireless project within two to five years. At this point, Saari says, Avecra has gotten much better control over its sales and material costs.

SIX CONTINENTS HOTELS

Atlanta

www.sixcontinents.com

This unit of London-based Six Continents PLC (formerly Bass PLC) began rolling out its wireless hotel locator and reservations service in North America in March. Six Continents requires users of its wireless reservation service to first enroll in its Priority Club via the Web. This lets Six Continents capture customer information such as the type of wireless device or devices a guest uses and his hotel preferences.

Once a customer's profile is set up, Six Continents can customize the content for him, thus reducing the number of keystrokes required and providing a greater level of security. The business unit, which owns, manages or franchises 3,200 hotels worldwide, plans to launch the service in Europe and Asia by year's end.

"Because we are able to support the company's wireless applications with over 260-plus devices, we are able to be available to our customers whenever and wherever," says Eric Pearson, vice president of e-commerce at Six Continents.

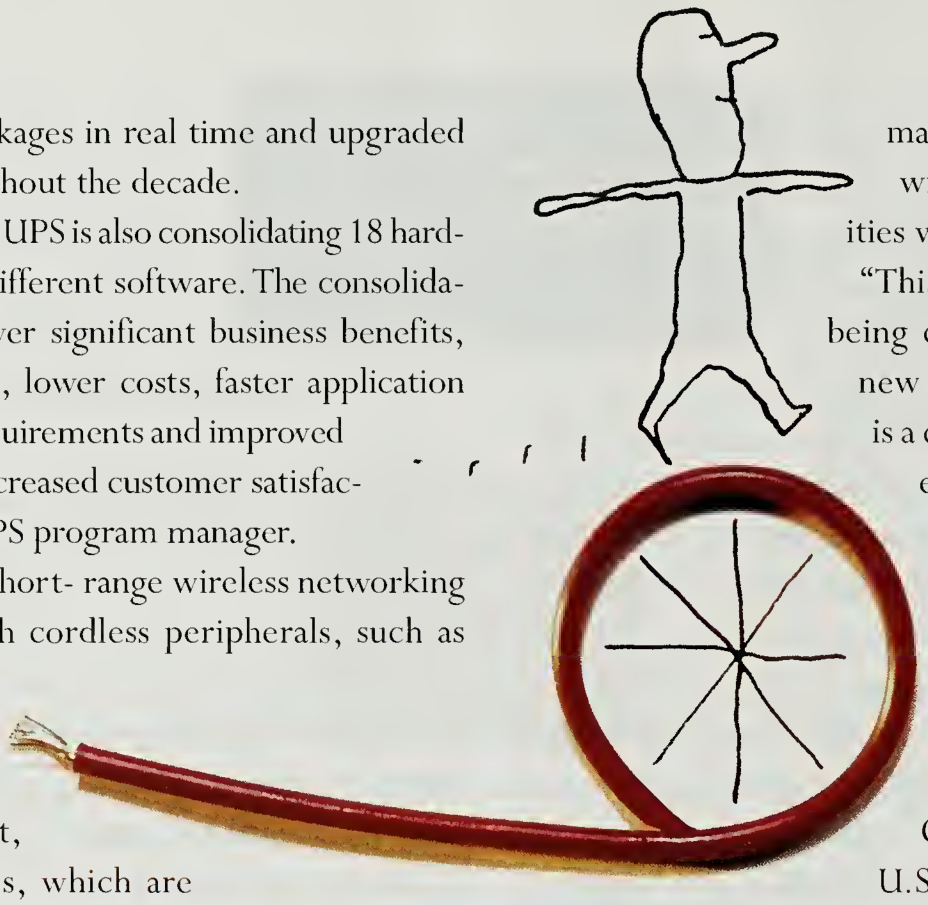
in the early 1990s to track packages in real time and upgraded and expanded the effort throughout the decade.

As part of its latest initiative, UPS is also consolidating 18 hardware terminals, each running different software. The consolidation of devices alone will deliver significant business benefits, including simplified operations, lower costs, faster application development, lower support requirements and improved data integrity, which leads to increased customer satisfaction, notes David Salzman, a UPS program manager.

UPS will use Bluetooth, a short- range wireless networking protocol to communicate with cordless peripherals, such as ring scanners. It uses wireless LANs to communicate with corporate systems. The project calls for fixed-mount, wearable and portable devices, which are expected to serve most UPS applications, from package tracking to equipment monitoring to two-way communications, Salzman says. UPS will also install advanced wireless LANs at all of its 2,000 facilities worldwide.

"This violates our basic philosophy of being close followers" when it comes to new technology, Salzman notes. "There is a certain 'gee-whiz' aspect to the project," he says, but UPS's prime interest is efficiency.

"For many companies, wireless is still a novelty, but it is technically possible to create wireless applications today with compelling features," says Jean-Christophe Cimetiere, CEO of the U.S. office of TechMetrix Research in Waltham, Mass. These firms show that wireless technology can indeed help achieve real business objectives. **ROI**



THRIFTY CAR RENTAL

Tulsa, Okla.

www.thrifty.com

See page 19

Insurance

PRODUCERS LLOYDS INSURANCE CO.

Amarillo, Texas

www.producerslloyds.com

This crop-insurance provider is using handhelds and the Internet to let agents access real-time pricing data from just about anywhere. Producers has invested just under $100,000 in the project, which brings agents data at the "point of need," says Larry Latham, company treasurer and project leader.

One big benefit: better and faster decision-making. "You never know what the weather is going to do, and making a decision too late because the coverage and cost information was not available could spell disaster," says Benson Latham, Producers' vice president of marketing.

Manufacturing

PRI AUTOMATION INC.

Billerica, Mass.

www.pria.com

In February 2000, PRI licensed Generation21 software to build its Web-based e-volution Training and Performance Support System. It provides employees with information on everything from routine system maintenance to mission-critical equipment error recovery.

Subsequently, PRI conducted a wireless test project that provided 30 employees with wireless Palm access to the system using Web-clipping technology. Although employees realized an immediate benefit in reduced data access times, the test revealed that workers could use richer access to multimedia information. So PRI implemented full-featured PC tablets that could easily work with video, graphics and sound via add-on wireless networking cards. The end result frees employees from network tethers and presents higher-quality system information in less time and without the need for hard-copy reference materials.

The system is used internally, but PRI expects to offer a similar capability to its external customers early next year. The system will let clients perform maintenance and repair, parts management and other tasks from anywhere within their own sites.

"Manufacturing plants can stretch as much as a mile long," says Peter Parsons, director of PRI's product knowledge and learning systems. "If we offer wireless support systems to our external clients, they could roam their entire site to manage equipment without needing cumbersome, strategically placed network connections."

Pharmaceuticals

PFIZER INC.

New York

www.pfizer.com

Pfizer's 150-year-old, eight-floor plant in Brooklyn houses manufacturing, packaging and shipping operations. It also contains an arsenal of wireless technologies for paperless manufacturing.

HOW WE SELECTED THE WIRELESS 25

The Wireless 25 awards project was designed to identify and honor those user organizations that are clear front-runners in successfully employing emerging and rapidly evolving wireless technologies to accomplish strategic business goals in new and innovative ways.

Our first step was to issue a call for nominations on our Web page (*www.computerworld.com/roi*). From May 1 to May 25, we received 115 nominations online. *Computerworld* editors also nominated organizations that they felt fit the definition of wireless technology innovators. We then sent the nominees comprehensive, 20-question surveys that addressed all aspects of their wireless projects, including the risks and challenges of deploying wireless, how wireless technology changed the way they conduct business, when they expect their wireless projects to yield a return on investment — and how they measure that return, and how they funded their projects.

Nominees completed and returned surveys, which were then reviewed by a panel of *Computerworld* and *Computerworld ROI* editors, who analyzed the qualitative and quantitative data. The surveys were scored, and a final list of 25 innovators was chosen based on the following criteria:

1. The strategic nature of the wireless project.
2. The risks associated with the project.
3. The degree to which the wireless project has yielded a positive return on investment measured in both financial and nonfinancial terms.

Computerworld ROI's Wireless 25 innovators are presented here in alphabetical order, by industry. *—Julia King*

Thirty-five RF antennas support the wireless transfer of process, inventory and other information from a variety of wireless Palm and bar-code scanning devices. These systems once required reams of paper along with data entry clerks to log nearly every step. Now, wireless applications monitor manufacturing progress in real time, optimize the use of equipment and manage inventory available to the manufacturing line. Information is also available on an intranet or via wireless to managers.

Thomas J. Cala, team leader of enterprise systems at Pfizer, says reducing human data entry requirements alone has saved Pfizer Brooklyn millions of dollars.

Technology

ITC

São Paulo, Brazil

www.itcsp.com.br

This systems integration firm designed and installed a wireless communications system to thwart Rio de Janeiro's infamous ticket scalpers at Maracan, the world's largest soccer stadium. The system, which employs Enterasys Networks' RoamAbout technology, now links the stadium's 10 electronic-ticket offices.

Eventually, it also will tie in remote ticket offices at neighborhood shopping centers and other locations. Fans are allowed to purchase five tickets each, with each purchase registered through the buyer's individual tax identification code. Since everyone is limited to five tickets, scalpers who used to buy hundreds of tickets to sell at a much higher price have been severely curtailed.

Since the system became operational last November, stadium officials have seen a 40% increase in the number of fans with legitimate tickets.

Transportation

UNITED PARCEL SERVICE

Atlanta

www.ups.com

See page 21

Wholesale

PACKAGED ICE INC.

Houston

See page 28

WESCO DISTRIBUTION INC.

Pittsburgh

www.wescodist.com

Practicality and ease of use were the key goals of this $4 billion electrical parts distributor's wireless project, which enables contractors at job sites to order from the company's 75,000-item catalog using a handheld wireless device.

Investment in the real-time field ordering system has been modest, primarily because Wesco piggybacked the system on its $2 million Web infrastructure. The payback: greater mind share and improved satisfaction among Wesco's construction company customers, which account for more than $1 billion in sales annually.

Sean T. Kelly and Allison Wright contributed to this story.

BIG COMPANIES OFTEN HAVE BIG SECURITY COMPLEXES WHEN IT COMES TO WIRELESS PROJECTS. HERE'S HOW SOME INNOVATORS OVERCAME THEIR FEARS

TAKING THE LEAP

BY MATT HAMBLEN

FOLLOWING A WAVE OF PUBLICITY ABOUT WIRELESS SECURITY WOES, a U.S. insurance company recently nixed its plan to electronically link executives over a wireless LAN along its mahogany row. The insurer's IT group convinced top brass that sensitive data on spreadsheets and in e-mail could be used to hurt the company if it were sniffed by a hacker within range of the wireless network.

Instead, IT argued for piloting the wireless network in a department that works with less critical information. "We thought the IT department's worry in that case was overblown," recalls Peter Firstbrook, an analyst at Stamford, Conn.-based Meta Group Inc., which was called in for advice about the plan. Firewall and encryption protections could have been put in place to guard the data on the wireless LAN and separate the wireless network from the company's other networks, Firstbrook says.

Lesson No. 1: However your company plans to secure wireless transactions, the decision will be second-guessed by somebody, and second-guessed again. To be sure, many analysts are warning clients that wireless applications can be highly insecure and that the lax practices of end users are often to blame (see more at *www.computerworld.com/roi*).

PHOTO-ILLUSTRATION BY STUART BRADFORD

Air Chamber
Receiving Station
Remalloy Bar Magnet
Protective Metal Grid
Contact Ring
Protective Silk Screen
Contact
Alloy
Anode

Still, after weighing the risks and warnings, and sometimes adding secure procedures and protections, many U.S. companies, from banks to manufacturers, are plodding forward with wireless pilots or full-scale rollouts to please customers or realize other business benefits.

Security concerns haven't deterred any of 11 organizations interviewed for this story from going ahead with their wireless projects, although most managers concede that security was constantly a prime consideration. And these wireless projects cover the waterfront — from salespeople and physicians using personal digital assistants (PDA) to check available inventory and patient data on the fly, to colleges giving wireless access to laptop-toting professors and students.

The devices they use range from cell phones and PDAs to laptops equipped with wireless cards used to communicate over WANs and LANs.

Competitive pressure pushed several of these wireless innovators to try something new, such as providing customers with wireless Internet access. But doing so has never been at the risk of compromising security or privacy of data, they say.

AFTER WEIGHING THE RISKS AND WARNINGS, MANY COMPANIES ARE PLODDING FORWARD WITH WIRELESS PILOTS OR FULL-SCALE ROLLOUTS.

"Security is not a competitive advantage, it's an assumption," says Mark Dickelman, a vice president in charge of mobile commerce at Chicago-based Harris Bank, a subsidiary of Bank of Montreal.

"Security is a worry, and it's one of the biggest hurdles," he adds. Only after overcoming many worries internally did Harris become the first bank to offer wireless banking to U.S. customers.

To increase the security of wireless banking, Harris works with its rivals in the banking industry on new wireless security measures. Also, analysts say Harris has developed a reputation among wireless carriers as a company that conducts exhaustive audits of its Wireless Application Protocol (WAP) gateways to confirm that they're functioning securely. Any WAP gateways that aren't certified by Harris as secure are blocked from connecting to the bank's servers. Because of federal oversight, banks are held to a higher standard than other businesses, Dickelman says.

In some ways, he says, the mobile Internet is safer to use than other modes of banking, such as ATMs. "At least I can control where I perform a transaction on my phone, but I can't do that on an ATM, and if somebody grabs me there, there's nothing I can do," he says.

But Harris is willing to keep investing in security to stay a front-runner in wireless banking. Customers say they like wireless banking, and that helps the bank achieve its goal of customer acquisition and retention, Harris officials say.

But no single piece of software or technique can ensure security. "There's no magic bullet with security," Dickelman says. "It's all about process."

At the University of California, Davis, Medical Center in Sacramento, 40 resident psychiatrists are using handhelds from Santa Clara, Calif.-based Palm Inc. to record notes from patient interactions. The data is beamed via infrared between Palm devices used by doctors on different shifts, says Dr. John Luo, director of psychiatric informatics. Luo himself uses the device when he sees patients.

Eventually, the data will be transmitted over a wireless LAN. But even now, device security risks are a key concern. Specifically, analysts worry that if a Palm device, smart phone or other handheld were lost or stolen, the data could be seen by someone who shouldn't see it. And data on a device, such as a password, could possibly help a thief gain access to a wider corporate network, analysts say.

"Yes, it was a bit of a leap of faith to give physicians devices because of the confidential nature of mental health information," says Luo. But he has thus far relied with great success on passwords on the devices as the prime security tool. He's now testing encrypting the data directly on the handheld, using software from Certicom Corp. in Hayward, Calif. F-Secure Corp. in Finland has similar technology.

So far, the physicians have accepted the encryption tool, even though it takes about 20 seconds to encrypt each file. But most users in the business world won't tolerate such delays, analysts caution.

As for data privacy, Luo says patients have the right to refuse to have their personal data entered on a handheld device. But he says he isn't so concerned about confidential data being compromised because physicians aren't entering sensitive data, such as a patient's entire history or prognosis, in a way that a layman could easily understand. Instead, they're using shorthand descriptions.

Luo and the entire medical establishment are bracing for new patient data protections under the Health Insurance Portability and Accountability Act. But he hasn't lost sight of the business benefit of having lightweight devices available for highly mobile doctors. "The business benefits have so far outweighed the security risk," he says, noting that patients have been pleased that the devices have helped process medication refills quickly.

Siemens Medical Solutions Health Services Corp. in Salt Lake City is in the midst of developing a much broader wireless application that will let physicians retrieve patient data via Web-connected wireless phones. Siemens envisions that this will allow access to data over longer distances and at many more hospitals. But security remains a key issue.

"If we cannot address security, it will be a showstopper," says Jyh-Ching Yaur, a Siemens software engineer and project leader. But although software designers "can provide tools to make security easier, we cannot do the security policy work of business managers," he says.

At Oakwood Healthcare Inc. in Dearborn, Mich., mobile devices are viewed as "mobile desktops equipped with encryption technology that has kept security fears at bay," says Dan Paton, information services adviser. As a result, "business gains have always outweighed security risks."

In other industries with wireless applications, security concerns are typically assessed at the outset of a project, and the risk is either deemed acceptable or is simply offset by adding server firewalls, virtual private networks and other encryption over links.

For example, at PRI Automation Inc., a Billerica, Mass.-based company that designs factory systems for the semiconductor industry, wireless access was set up for internal users to gain access to a knowledge database. One risk was quickly spotted when PRI's CEO questioned whether customers who had access to that database would be able to access security protocols contained there. It turned out that they would, so PRI set out to compartmentalize the information, says Peter Z.N. Parsons, director of product knowledge and learning.

As another relatively simple security protection, PRI has made the data accessible in Portable Document Format, readable through an Acrobat reader, which prevents future outside users from potentially corrupting files and data.

Parsons says the cost of these security precautions is measly compared with the value of the project. If a customer buys an automated tool from PRI and the tool fails, the customer can reduce costly downtime by wirelessly accessing PRI's database for a fix right on the spot.

Similarly, at Wesco International Inc., an electrical parts distributor in Pittsburgh, a wireless customer ordering process has been implemented to speed and enhance the accuracy of orders, says Russ Lambert, director of e-commerce.

Concerns about unauthorized ordering were mitigated by building a function that notifies a customer's accounting office via fax and e-mail each time a wireless order is received, he says.

GOOD IT MANAGEMENT IS MAKING TECHNOLOGY TRANSPARENT, BUT GOOD SECURITY IS ABOUT RESTRICTING ACCESS TO INFORMATION.

At Dallas-based chemical maker Celanese Ltd., the scope of a wireless project has been limited to company employees because of security considerations. Customer service representatives have wireless access to product availability and pricing information, which has helped dramatically reduce response times and improve order accuracy. But the company has decided against expanding the service to customers outside of its direct control for now, as a security protection.

"Security risks were never a showstopper for in-house users . . . but rolling this out to the public would need a much more exhaustive effort," says William L. Schmitt, director of business enablement.

In the end, it all comes down to a balancing act, experts say. Yes, companies must pursue wireless innovations, but they must do so with security interests at the forefront. "Good IT management for a business is making technology transparent to people, but good security administration is about restricting access to information," notes Jesper Johnson, an IT professor at Boston University. "And those are conflicting goals." ROI

BY MARY BRANDEL

KICKING BACK

INCREASED PRODUCTION, FASTER CASH FLOW AND A PRECIPITOUS DROP IN ON-THE-JOB STRESS ARE A FEW ADDED PAYBACKS OF A WIRELESS WORKFORCE

THE MAKING OF FROZEN WATER doesn't conjure up high-tech dreams. But look on top of Packaged Ice Inc.'s store-based ice-making machines, and you'll notice a satellite dish about the size of a half dollar, with a small modem that wirelessly transmits production and other data to Packaged Ice employees via the Web.

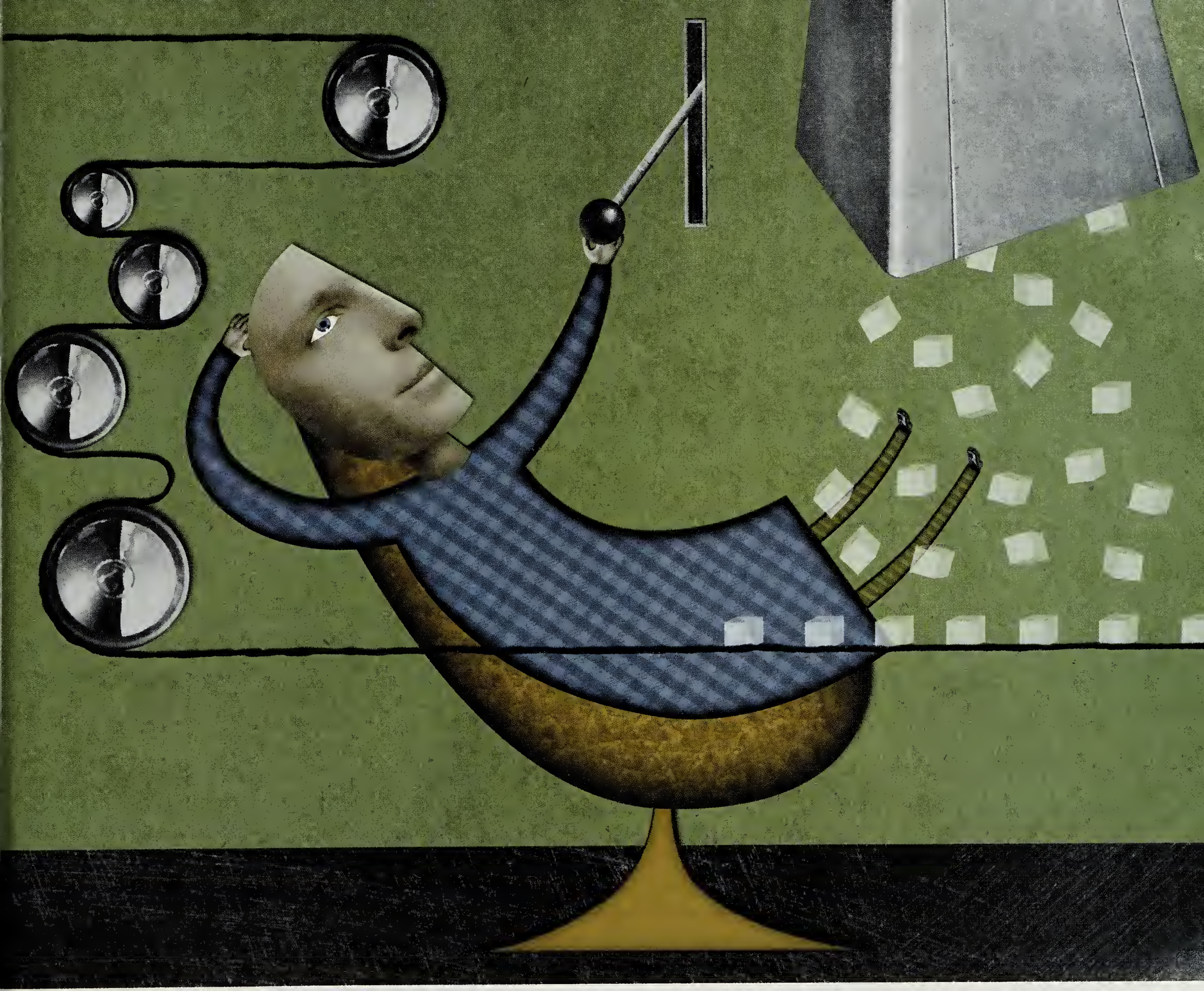
The system, PolarCast from Austin, Texas-based Isochron Data Corp., has nothing to do with ice-making, per se. Instead, it acts as a first-alert mechanism, monitoring things like air temperature, ice production and door status and alerting Packaged Ice to problems. If a customer forgets to close an ice machine's door, the company knows immediately, rather than hours later when a store manager calls to complain that the ice melted. "When there's no product to sell, we lose [revenue]," says Michael Busch, senior vice president at the Houston-based company. "Since we're selling by the bag, we want all the production we can get."

For Packaged Ice and others among *Computerworld ROI*'s Wireless 25, wireless has moved beyond a technology of convenience. Challenges remain with network coverage, standards and hardware glitches, but a growing number of companies are starting to see real business benefits from their wireless implementations. Those benefits include increased production, lower service costs, faster cash flow and even more sales. This is especially true for companies using wireless to solve a specific business problem for a mobile or remote workforce.

For instance, at Packaged Ice, many tasks that used to require on-site visits from service technicians can now be done remotely. From the company's headquarters, employees can turn machines on or off, run sanitation cycles, reset computers or check production levels — all via two-way wireless communication. This enables the technicians to tackle more complex problems and take care of more stores. The company used to assign one service technician to 50 machines but is now ratcheting that number up to 70, which translates into hundreds of thousands of dollars in cost savings per year.

And since the system was installed in April of last year, Packaged Ice is seeing a 10% increase in production from the in-

ILLUSTRATION BY JOYCE HESSELBERTH



store machines. And customer calls are down 76.9%, from 1.3 calls per month per machine to 0.3.

But enjoying the convenience of wireless and actually documenting a positive return on investment are two different things. "Today, measuring ROI for wireless is tough," says Craig Mathias, an analyst at Farpoint Group, a consulting company in Ashland, Mass. Part of the problem is that there are no standard metrics — no guidelines for determining a standard rate of return. And while some companies may be lowering costs or increasing sales, the returns from wireless technology can often be squishy, like improved white-collar productivity or instant access to critical information by a service technician or a physician. In those cases, the bottom line is only indirectly affected.

At the same time, positive ROI is pretty much a sure thing with wireless, Mathias says. This is especially true for the financial industry and with sales and service applications across multiple industries.

"If you have a service fleet or field salespeople, getting them information or retrieving it from them in real time is almost vital," he says. "And they can deal with the database directly, which improves efficiency because the chance of errors goes down enormously."

Since installing its wireless dispatch and field service system, Mesa Energy Systems Inc., a commercial heating, ventilation and air conditioning service provider in Irvine, Calif., has grown its revenue from $18 million to $30 million, without added staff. The system has also turned Mesa into a very different place to work, says Chuck Feyrer, Mesa's operations manager.

Before wireless, "the dispatcher was known as the heart and soul of the company," Feyrer says. Telephones rang continually as the company's 85 service technicians called in looking for their next jobs, and dispatchers barked out instructions and assignments. Mondays, when the technicians dropped off the prior week's service tickets and time sheets, were known as “nightmare Mondays.”

BILLS CAN NOW BE SENT OUT WITHIN 48 HOURS. “THE MINUTE THE CALL IS COMPLETE, IT'S IN THE SYSTEM,” SAYS CHUCK FEYRER OF MESA ENERGY SYSTEMS

“The guys were throwing paper at their dispatchers, who spent the day writing in missing job numbers and fixing transposed numbers. We used to have a rule: Nobody can talk to the dispatchers on Monday because they're so busy reconciling last week's paperwork, plus taking this week's calls.” Now, Feyrer says, “you go downstairs, and it's like a library.”

That's because all communications are transmitted between the technicians' handheld Windows CE-based devices and the dispatchers' desktop PCs. The system, by FieldCentrix Inc. in Irvine, Calif., enables technicians to fire up their handhelds each morning and get their lists of jobs, directions to job sites and background information, such as service histories and the names of people to report to. When a job is done, the technician captures a customer's signature, notes recommended repairs and closes the order. “Instead of turning in the work order several days later, it automatically gets sent back to the home office,” says Robert Lake, chief operating officer at Mesa. Technicians also send in their time sheets electronically.

As a result, dispatchers are less stressed-out, technicians are less frustrated, and customers appreciate the better-informed technicians. “One lady who dispatched for 10 years used to go home and freak out in the middle of the night,” Feyrer says. The difference between then and now, according to that dispatcher, “is like night and day.”

But the system's benefits extend well beyond morale. Productivity and efficiency are up, and cash flow is faster — not to mention Mesa's ability to win contracts and get into new areas of business, such as retail sales. “It isn't like, ‘We used to manually make widgets, and now we have this new machine, so now instead of making 10 an hour, we're making 100 an hour.’ It's not that easy to measure,” Lake says. “It affects everything.”

First are the efficiencies. Because technicians no longer wait for dispatchers to take their calls, they no longer waste an average of two to 30 minutes several times a day on hold. For the dispatchers, it takes half the time to reconcile time sheets with service tickets because the information is entered into the system automatically.

The new system has also increased sales. It used to take weeks to get a proposal out to a customer based on a technician's recommended repairs. Now proposals are turned around within 24 hours. That's because the information is sent in when the technician closes a work order, so an in-house salesperson can pull down that information two or three times a day and send out proposals immediately. Not only are more proposals being generated, but the hit rate is higher — two out of three vs. one out of three. “Internal sales used to account for $15,000 to $20,000 a month,” Lake says. “Now it's over $75,000 a month.”

But the most obvious area of ROI, according to Lake and Feyrer, is cash flow. It used to take three to four weeks to bill customers. Now that service tickets are sent in immediately, bills can be sent out within 48 hours. “The minute the call is complete, it's in the system,” Feyrer says.

These benefits don't even include having technicians query a server rather than a dispatcher for service histories, or the $2,000 to $3,000 in time savings from not having technicians converge at headquarters every Monday to turn in paperwork. “It's like the difference between the Flintstones and the Jetsons,” Feyrer says.

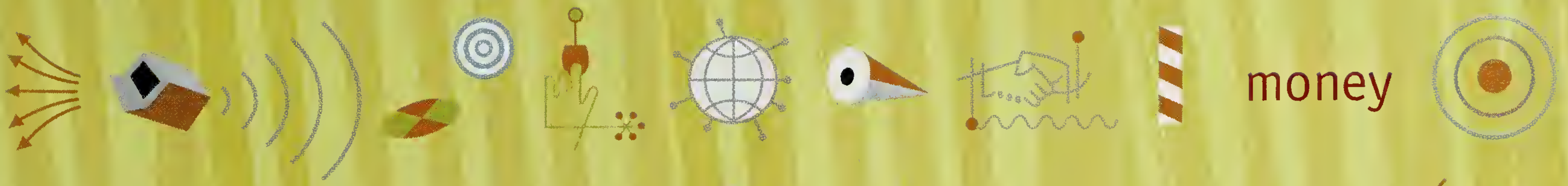
Mesa and Packaged Ice acknowledge that there have been roadblocks.

“This isn't a software system that you just plug in and say, ‘OK, run,’ ” Lake says. “It's only as good as what you commit to.” Mesa also had problems at first with the Windows CE hardware. “The first six months were pretty tough, but the last six months have been very good,” Lake adds. “There were a lot of headaches.”

Packaged Ice had to modify its system to overcome “dead zones,” with extensions to mount satellite dishes higher.

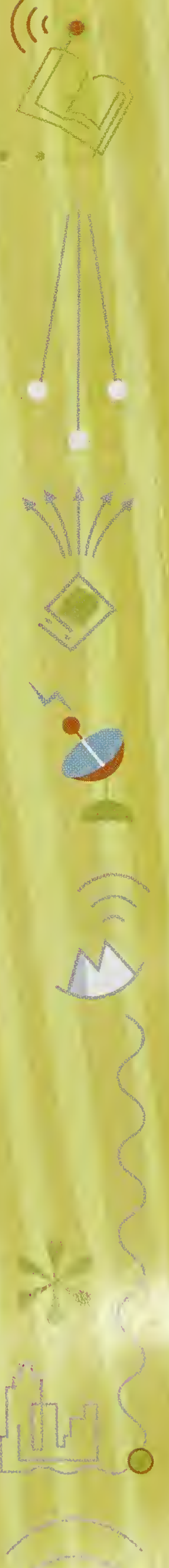
But both companies say now is the time to forge ahead to stay competitive. “All the ingredients are there to make it a positive strategy, especially for any business that distributes a product,” says Busch.

As for measuring ROI, the most important thing is quantifying year-over-year change and fine-tuning the business to take advantage of the benefits, says Busch. “Otherwise, you're providing better customer service, but you're not seeing a reduction in costs,” he says. “It's not free technology. You have to pay for it and benefit from it.” **ROI**



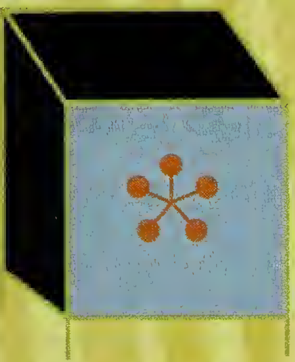
Expanding Your Universe

Existing wireless networks can host a galaxy of new applications **BY PIMM FOX**



A NEW ERA OF MOBILE WIRELESS DEVICES MAY finally give us the Dick Tracy style — and benefits — we've been craving. Many businesspeople routinely connect to their offices and other mobile colleagues via handheld voice and data devices. But high costs and limited functionality have impeded their universal use.

The subtle solution lies in building business-specific applications with off-the-shelf tools and then running them over existing wireless networks.



Take gasoline distributors, for example. They're using a combination of Global Positioning System (GPS) technology and two-way mobile wireless communications running over an existing wireless network to automate fuel sales and deliveries. Using GPS-enabled mobile data devices, the companies can schedule and monitor deliveries with preset pricing variances — recognizing a customer who's a tax-exempt farmer, for example, or a gas station that pays a different price.

"The nature of fuel deliveries is mundane and cumbersome," explains Shane Dyer, president of Bend, Ore.-based consulting firm Dyer Group. "At the end of the day, you used to have a stack of invoices on which you'd have to run a reconciliation, balancing the trucks' inventory. Now that's all synced with the mobile device and software at a central location." The technology to do this isn't necessarily new, but now lower prices for the software and wireless network connections have put it in reach of small and midsize businesses, Dyer says.

Simon Buckingham, an analyst at Mobile Lifestreams, a wireless consulting firm in London, says that before sorting through the services offered by wireless carriers, business managers should determine whether some type of mobile wireless application that runs on an existing wireless network can improve their businesses. To do so, they should ask the following questions:

- How do mobile workers gain access to information?
- With whom do they communicate, and how frequently?
- What tasks are duplicated or done manually on behalf of mobile workers?
- What resources will help them do their jobs?
- What problems do workers have when trying to communicate on the move?
- What information do customers and clients require?

Mobile sales forces are a ripe area for wireless services. Geographers' A-Z Map is a city-guide publishing firm in London that has 25 salespeople working from vans to directly restock retailers. The reps make 10 to 20 customer visits per day.

Paper orders used to arrive from the reps in batches after a lag of two to three days. Now, using a custom application built with off-the-shelf development tools and running on a Nokia 9110 Communicator, the reps can create orders on the fly using a bar code scanner to input the items ordered, check credit status and print a confirmation for the retailer. The system also handles partial orders and out-of-stock items, automatically triggering stock replenishment.

The key to doing wireless right is getting specific about what your people need to do their jobs more effectively. Let your business needs, not the latest new services, drive your mobile wireless strategy. You may be surprised to learn that off-the-shelf tools, a competitive development community and existing wireless networks can make the cost of the technology and training manageable. **ROI**

ILLUSTRATION: CELIA JOHNSON

Lonely on the Bleeding Edge

Wireless pioneers may be few, but they stand to reap great rewards from being first on the frontier **BY GUS TAI**

WITH THE EXCEPTION OF THE CELL phone, wireless technologies haven't quite made it into the mainstream of U.S. business. Although new technologies such as wireless broadband are making it easier to link networks and deliver information over the air, progress is slow and deployments are on the cutting edge. Companies turning to wireless to attack business problems may find that while the "return on innovation" can be great, being a technology pioneer can be lonely and fraught with risk.

A glaring example of a wireless technology not living up to the hype is the Wireless Application Protocol (WAP), which promised to marry voice and data communications in a simple cell phone interface. The reality is that its interface is cumbersome. In fact, market researcher Meta Group recently concluded that only 10% to 20% of corporate users still use the data capabilities in their WAP-enabled phones. The No. 1 reason for rejection: poor ergonomics.

But advances in device technology, network buildout and vertically focused application software promise to bring improvements in services. These technologies may be maturing to the point where companies have legitimate choices from new vendors offering managed services or enterprise software.

Successful vendors have focused on highly specific customer needs within a limited set of vertical industries. In the financial sector, Aether Systems and 724 Solutions have grown by capitalizing on the value of real-time access to information from any location. Colgate-Palmolive, for example, recently announced that it was automating its retail audit program by equipping its field reps with handhelds running mobile applications from start-up Thinque Systems.

These applications allow Colgate-Palmolive employees to track and instantly transmit information on how retailers are presenting, stocking and selling their products. Based on business-process rules and data, a field rep can also make real-time adjustments at a store to improve sales. Preliminary results showed a 45% improvement in audit times and significant reductions in administrative support costs.

Such gains in productivity illustrate why companies are willing to take on the risk of deploying wireless systems.

When everyone can log on from virtually anywhere in the building, collaboration across departments and disciplines is easier. A sales team discussing goals for the coming quarter could solicit immediate database-driven input from a manager in the finance department and take the meeting to a higher level of sophistication.

But there are drawbacks. The new wireless LANs have many of the same security needs as wired networks, but they haven't been around as long. The IEEE approved the wireless LAN standard in 1997, and it will be many years before network administrators can build up a knowledge base and experience comparable to what they have with wireline systems. At this point, hard data on reliability and security is scarce.

Striking the right balance between risk and reward can be difficult. Consider these points: Will the wireless application solve a critical business need? Will it contribute to your core competency? Colgate-Palmolive's field handhelds will do these things because the company expects to improve how it sells and displays goods. For wireless LANs, it may be harder to measure ROI. Anecdotal evidence won't be enough to persuade most CIOs to forge ahead. But for those who do, the rewards promise to be great. **ROI**

PHOTO-ILLUSTRATION: STEPHEN SHEFFIELD

HOW TO SETTLE DIFFICULTIES BY ARBITRATION.
Arbitration is an agreement by parties who have a contro-
versy or difference to submit the question to the decision of a

Don't Shoot the Messenger

Gagging researchers who find security flaws will backfire **BY ANN HARRISON**

WOULD YOU INVEST IN A DIGITAL ACCESS CONTROL system whose biggest users are trying to suppress evidence that it can be hacked?

Licensees of a digital watermarking system created by Verance Corp. should be asking themselves that question. The San Diego-based company was sued in June by a group of researchers who contend that Verance's biggest users in the music industry are trying to prevent them from revealing flaws in the company's watermarking technology.

Verance's watermarking system uses cryptography to secure content from unauthorized copying. In 1999, it was adopted as the worldwide industry standard for copy control of DVD-Audio and digitally delivered music under the first phase of the recording industry's Secure Digital Music Initiative (SDMI). The system's initial licensees included five major record labels and a broad spectrum of recorded music and Internet-based music delivery companies.

In September, the Washington-based Recording Industry Association of America (RIAA) and the SDMI Foundation invited anyone to try to break the watermark scheme to test its strength. Scientists from Princeton University and Rice University obliged and wrote a paper describing their successful attempt to remove a Verance watermark from a digital music file.

The researchers also documented vulnerabilities in other watermarking technologies. When Princeton computer science professor Ed Felten and his research team announced that they planned to publish their paper, the music industry tried to silence them.

Matt Oppenheim, an officer of both the RIAA and SDMI, sent Felten a letter threatening legal action if he published the results. Oppenheim contended that disclosure of the research could directly lead to the illegal distribution of copyrighted material. He claimed that Felten and his team had violated the contest rules and were subject to prosecution under the Digital Millennium Copyright Act, which prohibits discussion of technology that might be used to bypass copy controls. Verance and the RIAA declined to comment for this story.

Mathematics and computer code aren't circumvention devices. But Felten and his researchers were concerned about possible prosecution and withdrew their paper. The San Francisco-based Electronic Frontier Foundation sued the RIAA, SDMI, Verance and the U.S. Department of Justice. The plaintiffs asked the court to rule that they have a First Amendment right to present their research. "Studying digital access technologies and publishing the research for our colleagues are both fundamental to the progress of science and academic freedom," said Felten. "The recording industry's interpretation of the copyright act would make scientific progress on this important topic illegal."

Users of the Verance watermarking system should ask themselves if it's wise to invest in products from a company that suppresses peer review and full disclosure of flaws. They should take a close look at the value of digital rights-management systems that depend on litigation rather than strong cryptography to secure content. And they should figure out what they will say to their content providers and their shareholders if their watermarking scheme fails to prevent unauthorized copying of their intellectual property. **ROI**

ILLUSTRATION: GREG MORGAN

internet

More Online

- Do sweat the small stuff when looking at wireless security options.
- How to calculate the total cost of ownership of wireless technologies.
- More findings from our exclusive survey of the Wireless 25 innovators.

Go to www.computerworld.com/roi for more

preview

Coming in the November/December Issue

Old Habits Die Hard

Most companies have been lax about building customer awareness of self-service options. We lay out some cost-effective strategies for getting customers to hang up and log on.

Uh-Oh

A look at what can and does go wrong when IT-enabled self-service programs backfire, plus tips for steering clear of trouble such as inadvertently increasing, rather than reducing, phone call volumes.

Build or Buy?

Companies have a penchant for building their own self-service systems, rather than buying off the shelf. We explore which strategy delivers the better return on investment.

Keeping Score

The key to measuring company performance in today's customer-centric economy is with a new managerial tool: net relationship value.

balance sheet

Conduit Pays To Be Nice

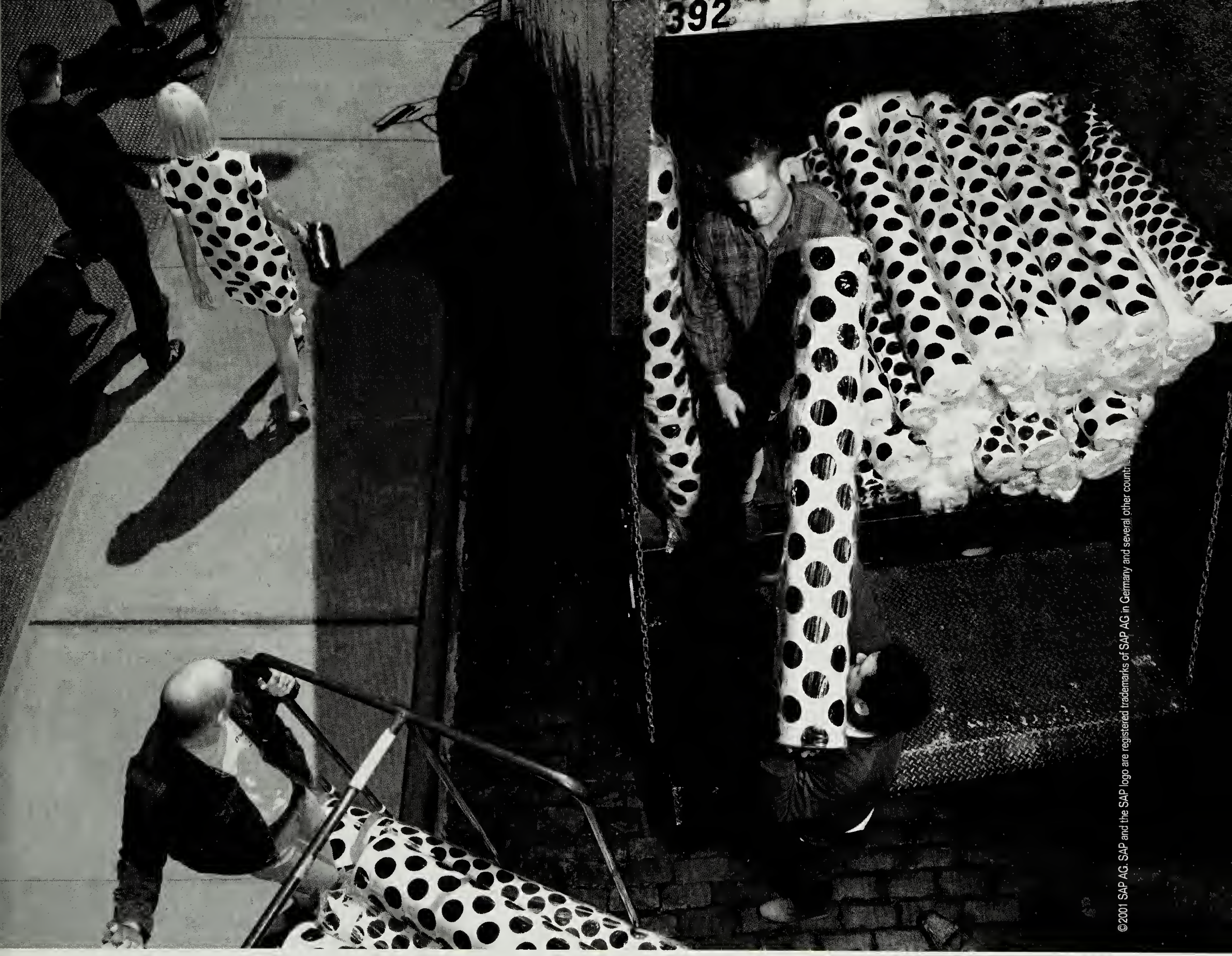
CONDUIT PLC IS a scrappy $30 million upstart in Europe's ultracompetitive telephone directory assistance business. With four call centers and 1,400 operators, the Dublin-based company is up against much bigger, national phone companies in Ireland, Austria, the U.K. and Switzerland.

The only way to beat the big guys is by delivering the most accurate information better and quicker, says Conduit CEO Liam Young. And the only way to do that, he says, is by training and paying operators to be fast and friendly.

Conduit installed Dublin-based Performix Technologies Ltd.'s Emvolve software, which simultaneously measures qualitative and quantitative job-performance factors. The numbers are gathered into a single assessment figure, which is then used to determine an operator's compensation.

Installed 18 months ago at $700 to $1,000 per employee, the system in Ireland already has paid for itself. Another system installed in January in Cardiff, Wales, paid for itself in less than eight months. For more details on Conduit's risks and rewards, visit *www.computerworld.com/roi* and click on Balance Sheet Notes. —*Julia King*

Before		After	
Call completion rate	18%	Call completion rate	30%
Database searches per call	3.2	Database searches per call	2.0
		Operator absenteeism down	15%
		Operator attrition down	30%



©2001 SAP AG. SAP and the SAP logo are registered trademarks of SAP AG in Germany and several other countr

THE BEST WAY TO MANAGE A SUPPLY CHAIN IS TO KNOW THE DEMAND CHAIN.

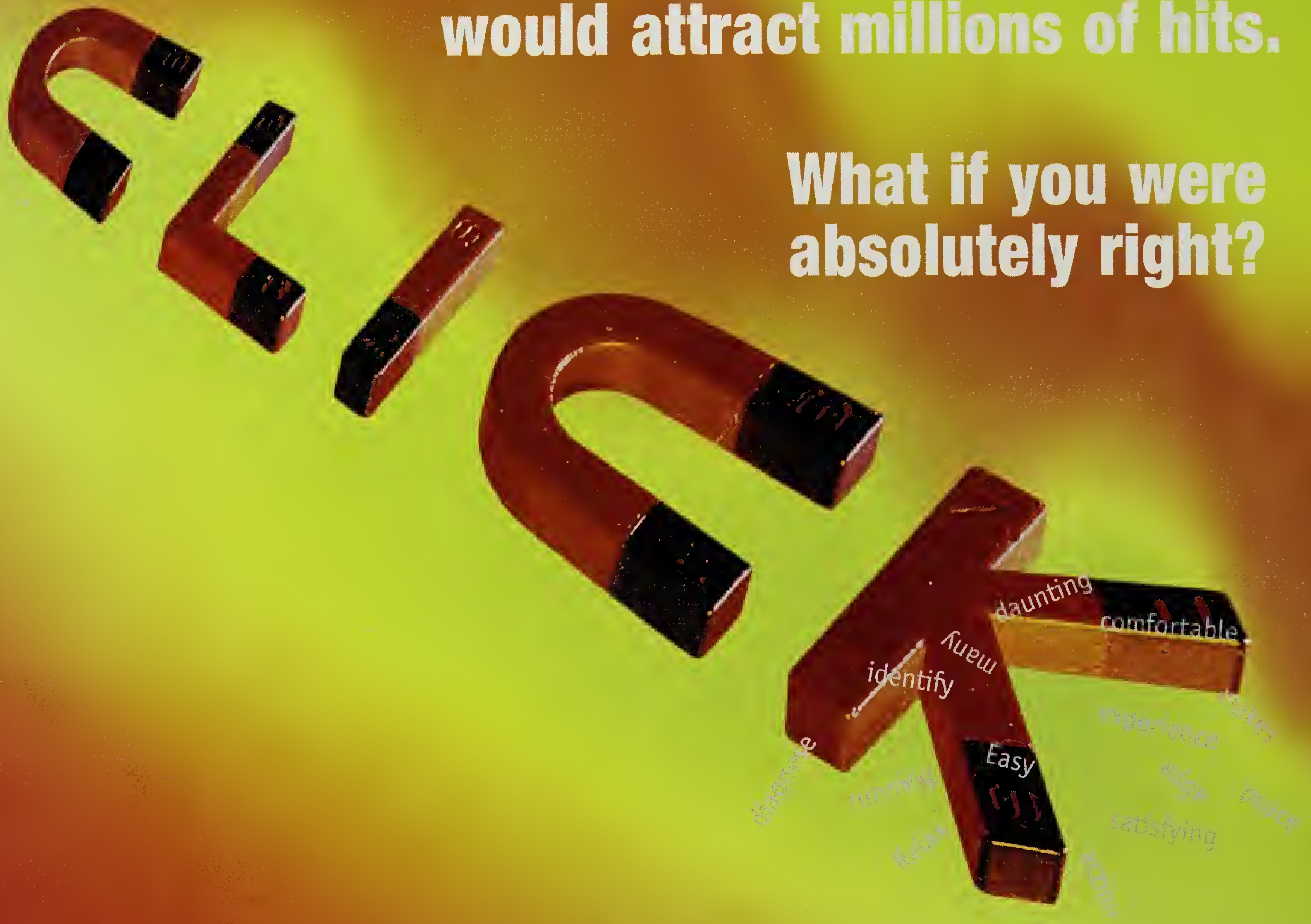
A supply chain is built around demand. And because demand can go from overwhelming to underwhelming in minutes, it can wreak havoc. That's why the mySAP™ Supply Chain Management solution integrates seamlessly to handle the hazards of supply and demand. It puts customers at the center of a networked supply chain, helping you anticipate market changes and fill orders faster. It also allows for high visibility, so vendors and suppliers can work together efficiently. Which makes it the only collaborative SCM solution that can turn a supply chain into a profit center. For more info, call 800 872 1727 or head to www.sap.com

THE BEST-RUN E-BUSINESSES RUN SAP

SAP™

You told the Board your site would attract millions of hits.

What if you were absolutely right?



Relax. The Tonic web applications management enterprise solution has arrived.

Suddenly the leading edge of e-business is a much more comfortable place to be. No matter how many customers you attract.

Tonic's ability to identify a web application problem before your customers do, diagnose the cause, and take automated corrective action — guarantees a satisfying on-line experience.

You'll have peace of mind in knowing that your site is available and performing at peak. That makes the e-world far less daunting. Even predictable.

Up and running in hours, not days. Easy to use with immediate results. That's Tonic. And that's better.
www.tonic.com

TONIC™ Guaranteeing Your Net Works.™

re, Inc.